THE DISTRIBUTION CODE

and

THE GUIDE TO THE DISTRIBUTION CODE

OF LICENSED DISTRIBUTION NETWORK OPERATORS
OF GREAT BRITAIN

Issue 20 – September 2013
# THE DISTRIBUTION CODE OF GREAT BRITAIN

## DOCUMENT CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGD 1.</td>
<td>EXPRESSIONS</td>
<td>9</td>
</tr>
<tr>
<td>DGD 2.</td>
<td>CONSTRUCTION OF REFERENCES</td>
<td>22</td>
</tr>
<tr>
<td>ANNEX 1</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>DIN1</td>
<td>INTERPRETATION</td>
<td>27</td>
</tr>
<tr>
<td>DIN2</td>
<td>DISTRIBUTION LICENCE DUTY</td>
<td>27</td>
</tr>
<tr>
<td>DIN3</td>
<td>SCOPE</td>
<td>27</td>
</tr>
<tr>
<td>DIN4</td>
<td>GENERAL REQUIREMENTS</td>
<td>28</td>
</tr>
<tr>
<td>DIN5</td>
<td>CODE RESPONSIBILITIES</td>
<td>28</td>
</tr>
<tr>
<td>DIN6</td>
<td>CONFIDENTIALITY</td>
<td>29</td>
</tr>
<tr>
<td>DIN7</td>
<td>PUBLICATIONS</td>
<td>29</td>
</tr>
<tr>
<td>DGC1</td>
<td>INTRODUCTION</td>
<td>31</td>
</tr>
<tr>
<td>DGC2</td>
<td>SCOPE</td>
<td>31</td>
</tr>
<tr>
<td>DGC3</td>
<td>UNFORESEEN CIRCUMSTANCES</td>
<td>31</td>
</tr>
<tr>
<td>DGC4</td>
<td>THE DISTRIBUTION CODE REVIEW PANEL</td>
<td>31</td>
</tr>
<tr>
<td>DGC5</td>
<td>COMMUNICATION BETWEEN THE DNO AND USERS</td>
<td>33</td>
</tr>
<tr>
<td>DGC6</td>
<td>DATA AND NOTICES</td>
<td>33</td>
</tr>
<tr>
<td>DGC7</td>
<td>OWNERSHIP OF PLANT AND/OR APPARATUS</td>
<td>34</td>
</tr>
<tr>
<td>DGC8</td>
<td>SYSTEM CONTROL</td>
<td>34</td>
</tr>
<tr>
<td>DGC9</td>
<td>EMERGENCY SITUATIONS</td>
<td>34</td>
</tr>
<tr>
<td>DGC10</td>
<td>DISTRIBUTION CODE RESPONSIBILITIES</td>
<td>34</td>
</tr>
<tr>
<td>DGC11</td>
<td>MODIFICATIONS TO THE DISTRIBUTION CODE</td>
<td>34</td>
</tr>
<tr>
<td>DPC1</td>
<td>GENERAL INTRODUCTION</td>
<td>36</td>
</tr>
<tr>
<td>DPC2</td>
<td>OBJECTIVES</td>
<td>40</td>
</tr>
<tr>
<td>DPC3</td>
<td>SCOPE</td>
<td>41</td>
</tr>
<tr>
<td>DPC4</td>
<td>DESIGN PRINCIPLES AND STANDARDS</td>
<td>42</td>
</tr>
<tr>
<td>DPC5</td>
<td>GENERAL REQUIREMENTS FOR CONNECTION</td>
<td>49</td>
</tr>
</tbody>
</table>

September 2013
<table>
<thead>
<tr>
<th>Document Code</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPC6</td>
<td>TECHNICAL REQUIREMENTS FOR CONNECTIONS</td>
<td>53</td>
</tr>
<tr>
<td>DPC7</td>
<td>REQUIREMENTS FOR EMBEDED GENERATORS</td>
<td>56</td>
</tr>
<tr>
<td>DPC8</td>
<td>TRANSFER OF PLANNING DATA</td>
<td>71</td>
</tr>
<tr>
<td>DOC1</td>
<td>DEMAND FORECASTS</td>
<td>75</td>
</tr>
<tr>
<td>DOC 1 - APPENDIX 1</td>
<td></td>
<td>79</td>
</tr>
<tr>
<td>DOC 1 - APPENDIX 2</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>DOC2</td>
<td>OPERATIONAL PLANNING</td>
<td>81</td>
</tr>
<tr>
<td>DOC 2 - APPENDIX 1</td>
<td></td>
<td>85</td>
</tr>
<tr>
<td>DOC 2 - APPENDIX 2</td>
<td></td>
<td>86</td>
</tr>
<tr>
<td>DOC 2 - APPENDIX 3</td>
<td></td>
<td>87</td>
</tr>
<tr>
<td>DOC5</td>
<td>TESTING AND MONITORING</td>
<td>89</td>
</tr>
<tr>
<td>DOC6</td>
<td>DEMAND CONTROL</td>
<td>95</td>
</tr>
<tr>
<td>DOC7</td>
<td>OPERATIONAL LIAISON</td>
<td>99</td>
</tr>
<tr>
<td>DOC8</td>
<td>SAFETY CO-ORDINATION</td>
<td>104</td>
</tr>
<tr>
<td>DOC9</td>
<td>CONTINGENCY PLANNING</td>
<td>108</td>
</tr>
<tr>
<td>DOC10</td>
<td>OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY</td>
<td>114</td>
</tr>
<tr>
<td>DOC 10 - APPENDIX 1</td>
<td></td>
<td>117</td>
</tr>
<tr>
<td>DOC11</td>
<td>NUMBERING AND NOMENCLATURE OF ELECTRICAL APPARATUS AT OWNERSHIP BOUNDARIES</td>
<td>118</td>
</tr>
<tr>
<td>DOC12</td>
<td>SYSTEM TEST</td>
<td>120</td>
</tr>
<tr>
<td>DDRC1</td>
<td>INTRODUCTION</td>
<td>126</td>
</tr>
<tr>
<td>DDRC2</td>
<td>OBJECTIVE</td>
<td>126</td>
</tr>
<tr>
<td>DDRC3</td>
<td>SCOPE</td>
<td>126</td>
</tr>
<tr>
<td>DDRC4</td>
<td>DATA CATEGORIES</td>
<td>127</td>
</tr>
<tr>
<td>DDRC5</td>
<td>PROCEDURES AND RESPONSIBILITIES</td>
<td>128</td>
</tr>
<tr>
<td>DDRC6</td>
<td>DATA TO BE REGISTERED</td>
<td>129</td>
</tr>
<tr>
<td>SCHEDULE 5A</td>
<td></td>
<td>131</td>
</tr>
<tr>
<td>SCHEDULE 5C (II)</td>
<td></td>
<td>138</td>
</tr>
<tr>
<td>SCHEDULE 5C (III)</td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>DATA REGISTRATION CODE</td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>SCHEDULE 5C (IV)</td>
<td></td>
<td>142</td>
</tr>
</tbody>
</table>
GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

1. ELECTRICITY SUPPLY INDUSTRY
   1.1 GENERATION
   1.2 TRANSMISSION
   1.3 DISTRIBUTION
   1.4 SUPPLY
   1.5 METERING

2 PRINCIPAL ORGANISATIONS

3 PRINCIPLES OF AN INTERCONNECTED SYSTEM
   3.1 GENERAL
   3.2 DEMAND FORECASTING
   3.3 SYSTEM SECURITY
   3.4 INDUSTRY STRUCTURE

4 GRID AND DISTRIBUTION CODES

5 DISTRIBUTION CODE
   5.1 GENERAL
   5.2 DISTRIBUTION CODE REVIEW PANEL
   5.3 DISTRIBUTION CODE SECTIONS
   5.4 DISTRIBUTION PLANNING AND CONNECTION CODE
      5.4.1 Design Principles and Standards (DPC4)
      5.4.2 Network Statements (DPC4.5)
      5.4.3 Charges for Information
      5.4.4 Exchange of Information (DPC5)
      5.4.5 Embedded Generators (DPC7)
      5.4.6 Application for Connection Procedures
The following items do not form part of the approved Distribution Code and are for information only:

- Guidance Notes 1 to 3
- The Introduction to the Distribution Code, ie DIN1 to DIN 7
- The Guide to the Distribution Code of Great Britain
GUIDANCE NOTE 1

(Dated 01.04.1993 England and Wales Distribution Code
Adopted for the Distribution Code of Great Britain)

ENGINEERING RECOMMENDATION P2/6

The Distribution Code Review Panel has reviewed Engineering Recommendation P2/6 and for Customers falling within the remit of the Distribution Code has agreed that:

The main section of this document deals with the establishment of recommendations for the security of electricity transmission and distribution systems of network operators. It does not apply to the supply connection of a Customer.

Each Customer supply connection needs to be considered on its own merits by discussion between the Customer and the network operator. The costs of providing a Customer supply connection by the network operator will be partly dependent upon the nature of the network operator’s electrical system and the location of the Customer’s premises. It will be for the Customer to decide, in negotiations with the network operator, the level of security required for the electricity supply to be provided to the Customer’s premises. In general, the greater the level of security of supply required by the Customer, the greater the capital investment required by the network operator, as a consequence this will require the Customer to meet a higher level of supply connection charge.
GUIDANCE NOTE 2/4

First issued 03 March 2011 – updated 06 October 2011

Second Issue 29 March 2012

Third Issue December 2012.

Fourth Issue September 2013

ENGINEERING RECOMMENDATIONS G83 AND G59

This guidance note was originally issued on 03 March 2011 and its main provision was to allow the use small scale generation of capacity greater than 16A per phase, provided it had been type tested to the requirements of G83/1-1 but with a modified over frequency protection setting.

It has been updated on the dates above to allow a period of grace following the introduction of revised versions of G59 and G83 in which manufacturers can adapt their equipment to the changed requirements of these documents.

Now that G83/2 and G59/3 have been published the Distribution Code Review Panel wishes to see the following continuing interpretation:

- For all small scale embedded generation sets of up to and including 16A per phase (provided that the aggregate capacity of installed generation is less than or equal to 16A per phase), until 1 March 2014 it is permissible to connect to the general requirements of previous versions of G83 provided this is through an inverter or controller with a protection/control system that has either been fully type tested in accordance with G83/1-1, G83/2 or in accordance with G59/2. After 1 March 2014 it will only be allowable to connect small scale embedded generation of up to and including 16A per phase that complies with G83/2 (or with G59/3 for small scale embedded generation sets non-compliant with G83/2).

- Connection of small scale embedded generation of above 16A per phase (including the connection of small scale embedded generation of less than 16A per phase where the aggregate capacity of installed generation is greater than 16A per phase) made before 1 December 2014 can be in accordance with either G59/2-1 or G59/3. Such connections made after 1 December 2014 must be made in accordance with G59/3.
GUIDANCE NOTE 3

First issued 1 December 2012

ENGINEERING RECOMMENDATIONS G83

The Panel is aware that small scale generation using the Stirling engine as a prime mover has been designed using resonance to operate within ±1% of the nominal frequency of 50Hz. Accordingly it is not technically possible for generation using this technology currently to remain connected down to 47.0 Hz as required by G83/2.

Recognizing the limitations of the current technology, and noting that currently the adoption of this technology is niche and far from mass market, the Panel believes that those G83/2 tests relating to behaviour at frequencies outside of the ±1% range should be waived or modified, thus allowing this technology to continue its niche use.

In the longer term the Panel expects that either the requirements of the EU Network Code “Requirements for all Generators” when enacted in UK law will require Stirling engine designs to be modified to comply, or to seek a specific derogation. Similarly if the growth of this technology showed a risk of being material, then again full compliance with G83 would be required. The Panel believes that a sensible threshold of materiality, considering the technical and commercial effects of the technology, to be 50MW.

This note applies from 1 December 2012 and applies in force until 31 December 2016.
DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)
DGD 1. EXPRESSIONS

In this Distribution Code the following words and expressions shall, unless the subject matter or context otherwise requires or is inconsistent therewith, bear the listed meanings:-

**Act**  The Electricity Act 1989 (as amended by the Utilities Act 2000 and the Energy Act 2004).

**Active Power**  The product of voltage and the in-phase component of alternating current measured in units of watts, normally measured in kilowatts (kW) or megawatts (MW).

**Annex 1 Standard**  A electricity industry national standard that implements Distribution Code requirements and which is listed in Annex 1 of the Distribution Code, and forms part of the Distribution Code.

**Annual Average Cold Spell (ACS) Conditions**  A particular combination of weather elements that give rise to a level of Peak Demand within a financial year which has a 50% chance of being exceeded as a result of weather variation alone.

**Apparatus**  All Equipment in which electrical conductors are used, supported or of which they may form a part.

**Appendix 2 Standard**  A electricity industry national standard that has a material effect on Users but does not implement any Distribution Code requirements and does not form part of the Distribution Code technical requirements. A list of these standards is maintained by the Distribution Code Review Panel as Appendix 2 to the Guide to the Distribution Code.

**Authorised Electricity Operator or AEO**  Any person (other than the DNO in its capacity as an operator of a Distribution System) who is authorised to generate, participate in the transmission of, distribute or supply electricity.

**Authority**  The Gas and Electricity Markets Authority established under Section 1 of the Utilities Act 2000.

**Average Conditions**  That combination of weather elements within a period of timewhich is the average of the observed values of these weather elements during equivalent periods over many years (Sometimes referred to as normal weather).

**Balancing and Settlement Code (BSC)**  The code of that title as from time to time amended.

**Balancing Mechanism**  Has the meaning set out in NGC’s Transmission Licence.
DISTRIBUTION GLOSSARY AND DEFINITIONS (DGD)

BM Unit
Has the meaning set out in the BSC, except that for the purposes of the Distribution Code the reference to “Party” in the BSC shall be a reference to a User.

BM Participant
A person who is responsible for and controls one or more BM Units or where a CUSC Bilateral Agreement specifies that a User is required to be treated as a BM Participant for the purpose of the Grid Code. For the avoidance of doubt, it does not imply that they must be active in the Balancing Mechanism.

Black Start
The procedure necessary for a recovery from a Total Shutdown or Partial Shutdown.

Black Start Station
A Power Station which is registered pursuant to a CUSC Bilateral Agreement with NGC, as having a Black Start Capability.

CENELEC
European Committee for Electrotechnical Standardisation.

Civil Emergency Direction
Directions given by the Secretary of State to AEOs for the purpose of mitigating the effects of any natural disaster or other emergency which, in the opinion of the Secretary of State, is or may be likely to disrupt electricity supplies.

Committed Project Planning Data
Data relating to a User Development once the offer for a Connection Agreement is accepted.

Connection Agreement
An agreement between the DNO and the User or any Customer setting out the terms relating to a connection with the DNO’s Distribution System (excluding any CUSC Bilateral Agreement).

Connection Point
An Entry Point or an Exit Point of the Distribution System as the case may be.

Control Centre
A location used for the purpose of control and operation of all, or of part of a Distribution System, National Electricity Transmission System or the System of a User.

Control Person
A person who has been nominated by an appropriate officer of the DNO, Transmission Licensee or a User to be responsible for controlling and co-ordinating safety activities necessary to achieve Safety From The System.

Control Phase
The period 0-24 hours inclusive ahead of real time operation. The Control Phase follows on from the Programming Phase and covers the period down to real time.

CUSC
Has the meaning set out in NGC’s Transmission Licence

CUSC Bilateral Agreement
An agreement pursuant to the CUSC Framework Agreement made between NGC and a User of the National Electricity Transmission System.
CUSC Disputes Resolution Procedure
The procedure described in CUSC relating to disputes resolution.

CUSC Framework Agreement
Has the meaning set out in NGC’s Transmission Licence.

Customer
Any person supplied or entitled to be supplied with electricity at any premises within Great Britain but shall not include any Authorised Electricity Operator in its capacity as such.

Customer With Own Generation or CWOG
A Customer with one or more Generation Sets connected to the Customer’s System, providing all or part of the Customer’s electricity requirements, and which may use the DNO’s Distribution System for the transport of any surplus of electricity being exported.

DC Converter
Any Apparatus used to convert alternating current electricity to direct current electricity, or vice versa. A DC Converter is a standalone operative configuration at a single site comprising one or more converter bridges, together with one or more converter transformers, converter control equipment, essential protective and switching devices and auxiliaries, if any, used for conversion. In a bipolar arrangement, a DC Converter represents the bipolar configuration.

DNO’s Distribution System
The System consisting (wholly or mainly) of electric lines owned or operated by the DNO and used for the distribution of electricity between the Grid Supply Points or Generation Sets or other Entry Points to the points of delivery to Customers or Authorised Electricity Operators, or any Transmission Licensee within Great Britain and Offshore in its capacity as operator of the licensee’s Transmission System or the National Electricity Transmission System and includes any Remote Transmission Assets (owned by a Transmission Licensee within Great Britain), operated by the DNO and any electrical plant and meters and metering equipment owned or operated by the DNO in connection with the distribution of electricity, but shall not include any part of the National Electricity Transmission System.

Decimal Week
The week numbering system where week 1 commences in the first week of January on a date as advised by the DNO.

Demand
The demand of MW or MVAr of electricity (ie both Active Power and Reactive Power respectively) unless otherwise stated.
Demand Control

Any or all of the following methods of achieving a Demand reduction:
(a) Customer voltage reduction initiated by the DNO (other than following an instruction from NGC);
(b) Customer Demand reduction by disconnection initiated by the DNO (other than following an instruction from NGC);
(c) Demand reduction instructed by NGC;
(d) automatic low frequency Demand disconnection;
(e) emergency manual Demand disconnection

Demand Control Notification Level

The level above which the DNO has to notify NGC of its proposed or achieved use of Demand Control which is 12 MW in England and Wales and 5 MW in Scotland.

Detailed Planning Data (DPD)

Detailed additional data which the DNO requires under the Distribution Planning and Connection Code in support of Standard Planning Data.

Distribution Business

The authorised business of the DNO or any affiliate or related undertaking of the DNO (whether the business is undertaken by the DNO or another licence holder), comprising:
(a) the distribution of electricity through the DNO’s Distribution System, including any business in providing connections to such System; and
(b) the provision of Distributor Metering and Data Services as defined in the Distribution Licence.

Distribution Code

A code required to be prepared by a DNO pursuant to condition 9 (Distribution Code) of a Distribution Licence and approved by the Authority as revised from time to time with the approval of, or by the direction of, the Authority.

Distribution Code Review Panel or Panel

The standing body established under the Distribution Glossary and Definitions.

Distribution Data Registration Code

That portion of the Distribution Code which is identified as the Distribution Data Registration Code.

Distribution General Conditions or DGC

That portion of the Distribution Code which is identified as the Distribution Glossary and Definitions.

Distribution Glossary and Definitions

That portion of the Distribution Code which is identified as the Distribution Glossary and Definitions.

Distribution Introduction (DIN)

That portion of the Distribution Code which is identified as the Distribution Introduction.

Distribution Licence

A distribution licence granted under Section 6(1)(c) of the Act.

Distribution Network Operator (DNO)

The person or legal entity named in Part 1 of the Distribution Licence and any permitted legal assigns or successors in title of the named party.
Distribution Operating Code (DOC)

That portion of the Distribution Code which is identified as the Distribution Operating Code.

Distribution Planning and Connection Code (DPC)

That portion of the Distribution Code which is identified as the Distribution Planning and Connection Code.

Distribution System

The electrical network operated by an Other Authorised Distributor.

Distribution Use of System Agreement

The standard form of agreement of that name, as amended from time to time.

Earthing Device

A means of providing a connection between an Isolated conductor and earth.

Electricity Safety, Quality and Continuity Regulations (ESQCR)

The statutory instrument entitled The Electricity Safety, Quality and Continuity Regulations 2002 as amended from time to time and including any further statutory instruments issued under the Act in relation to the distribution of electricity.

Embedded

Having a direct electrical connection to a Distribution System.

Embedded Generator

A Generator including a Customer With Own Generation whose Generation Sets are directly connected to the DNO’s Distribution System or to an Other Authorised Distributor connected to the DNO’s Distribution System.

The definition of Embedded Generator also includes the OTSO in relation to any Embedded Transmission System

Embedded Transmission Licensee

Offshore Transmission Licensee for an Embedded Transmission System

Embedded Transmission System

An Offshore Transmission System directly connected to the DNO’s Distribution System or to an Other Authorised Distributor connected to the DNO’s Distribution System.

Entry Point

The point at which an Embedded Generator or other Users connect to the DNO’s Distribution System where power flows into the DNO’s Distribution System under normal circumstances.

Equipment

Plant and/or Apparatus.

Electricity Supply Industry (ESI)

Electricity Supply Industry.

Event

An unscheduled or unplanned (although it may be anticipated) occurrence on or relating to a System including, without limiting that general description, faults, incidents and breakdowns and adverse weather conditions being experienced.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Offshore Generators</strong></td>
<td>A <strong>Generator</strong> with a <strong>Power Station</strong> located in offshore waters that has an agreement for connection to the <strong>DNO’s Distribution System</strong> via lines of 132kV or above that are wholly or partly in offshore waters.</td>
</tr>
<tr>
<td><strong>Exit Point</strong></td>
<td>The point of supply from the <strong>DNO’s Distribution System</strong> to a <strong>User</strong> where power flows out from the <strong>DNO’s Distribution System</strong> under normal circumstances.</td>
</tr>
<tr>
<td><strong>External Interconnection</strong></td>
<td>A connection to a party outside the <strong>Total System.</strong></td>
</tr>
<tr>
<td><strong>Fault Level</strong></td>
<td>Prospective current that would flow into a short circuit at a stated point in the <strong>System</strong> and which may be expressed in kA or, if referred to a particular voltage, in MVA.</td>
</tr>
<tr>
<td><strong>Feasibility Project Planning Data</strong></td>
<td>Data relating to a proposed <strong>User Development</strong> until such time that the <strong>User</strong> applies for a <strong>Connection Agreement</strong>.</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>The number of alternating current cycles per second (expressed in Hertz) at which a <strong>System</strong> is running.</td>
</tr>
<tr>
<td><strong>Fuel Security Code</strong></td>
<td>The document of that title designated as such by the <strong>Secretary of State</strong>, as from time to time amended.</td>
</tr>
<tr>
<td><strong>Generating Plant</strong></td>
<td>A <strong>Power Station</strong> including any <strong>Generation Set</strong> therein.</td>
</tr>
<tr>
<td><strong>Generating Plant Output</strong></td>
<td>That portion of the output of <strong>Generating Plant</strong> which is contributing to meeting <strong>Demand.</strong></td>
</tr>
<tr>
<td><strong>Generation Set</strong></td>
<td>Any <strong>Apparatus</strong> which produces electricity.</td>
</tr>
<tr>
<td><strong>Generator</strong></td>
<td>A person who generates electricity under licence or exemption under the <strong>Act.</strong></td>
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<tr>
<td></td>
<td>A person who has connected a <strong>Generation Set(s)</strong> in accordance with Item 13 DGD Engineering Recommendation G83/2 (“Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16 A Per Phase) in Parallel With Public Low-Voltage Distribution Networks”) and where this is (are) their only <strong>Generation Set(s)</strong>, is not classed as a <strong>Generator</strong> for the purpose of this Distribution Code.</td>
</tr>
<tr>
<td><strong>Great Britain or GB</strong></td>
<td>“The landmass of England &amp; Wales and Scotland, including internal waters”.</td>
</tr>
<tr>
<td><strong>Grid Code</strong></td>
<td>The code which <strong>NGC</strong> is required to prepare under its <strong>Transmission Licence</strong> and have approved by the <strong>Authority</strong> as from time to time revised with the approval of, or by the direction of, the <strong>Authority</strong>.</td>
</tr>
<tr>
<td><strong>Grid Supply Point</strong></td>
<td>Any point at which electricity is delivered from the <strong>National Electricity Transmission System</strong> to the <strong>DNO’s Distribution System.</strong></td>
</tr>
<tr>
<td><strong>High Voltage (HV)</strong></td>
<td>A voltage exceeding 1000 Volts.</td>
</tr>
</tbody>
</table>
## Distribution Glossary and Definitions (DGD)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Voltage Customer</strong></td>
<td>A Customer connected to a part of the Distribution System which is operating at HV.</td>
</tr>
<tr>
<td><strong>Implementing Control Person</strong></td>
<td>Pursuant to DOC8, the person implementing Safety Precautions at an Operational Boundary.</td>
</tr>
<tr>
<td><strong>Individual DNO Standard</strong></td>
<td>A standard adopted by an individual DNO and which is published as such by an individual DNO and that has a material effect on Users.</td>
</tr>
<tr>
<td><strong>IEC</strong></td>
<td>International Electrotechnical Commission.</td>
</tr>
<tr>
<td><strong>Independent Distribution Network Operator</strong></td>
<td>A DNO that does not have a Distribution Services Obligation Area in its Distribution Licence and is not an ex Public Electricity Supplier.</td>
</tr>
<tr>
<td><strong>Industry Codes Technical Group (ITCG)</strong></td>
<td>A standing body comprised of representatives of all the DNOs to carry out the functions referred to in its own Constitution and Rules.</td>
</tr>
<tr>
<td><strong>Isolated</strong></td>
<td>Disconnected from associated Plant and Apparatus by an Isolating Device(s) in the isolating position or by adequate physical separation or sufficient gap.</td>
</tr>
<tr>
<td><strong>Isolating Device</strong></td>
<td>A device for rendering Plant and Apparatus Isolated.</td>
</tr>
<tr>
<td><strong>Joint System Incident</strong></td>
<td>Is an Event occurring on the System or installation, which, in the opinion of the DNO, has or may have a serious and/or widespread effect on the System or installation of another.</td>
</tr>
</tbody>
</table>
| **Large Power Station** | A Power Station which is connected to a System notionally connected to a Grid Supply Point in;  
  a. NGC’s Transmission Area with a Registered Capacity of 100 MW or more;  
  b. SP Transmission Limited’s Transmission Area with a Registered Capacity of 30MW or more;  
  c. Scottish Hydro-Electric Transmission Limited’s Transmission Area with a Registered Capacity of 10MW or more. |
<p>| <strong>Limited Frequency Sensitive Mode</strong> | A mode whereby the operation of a Generation Set is Frequency insensitive except when the System Frequency exceeds 50.4Hz, from which point Limited High Frequency Response must be provided. |
| <strong>Limited High Frequency Response</strong> | A response of a Generation Set to an increase in System Frequency above 50.4Hz leading to a reduction in Active Power in accordance with the provisions of Grid Code BC3.7.2. |
| <strong>Load Managed Area</strong> | Has the meaning given to that term in the Distribution Use of System Agreement. |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Voltage or LV</td>
<td>In relation to alternating current, a voltage exceeding 50 volts but not exceeding 1 000 volts.</td>
</tr>
<tr>
<td>Maximum Generation</td>
<td>The additional output obtainable from Generating Plant in excess of Registered Capacity.</td>
</tr>
<tr>
<td>Medium Power Station</td>
<td>A Power Station which is connected to a System notionally connected to a Grid Supply Point in NGC’s Transmission Area with a Registered Capacity of 50 MW or more but less than 100 MW. For the avoidance of doubt an installation comprising one or more DC Converters with an aggregate capacity of between 50 and 100MW will be classed as a Medium Power Station for the purposes of this Distribution Code.</td>
</tr>
<tr>
<td>Meter Operation Code of Practice Agreement</td>
<td>The agreement of that name, as amended from time to time.</td>
</tr>
<tr>
<td>Meter Operator</td>
<td>A person, registered with the Registration Authority, appointed by either a Supplier or Customer to provide electricity meter operation services. (This Distribution Code does not place any direct obligation on Meter Operators other than through the appointment by either a Supplier or a Customer.)</td>
</tr>
<tr>
<td>Minimum Generation</td>
<td>The minimum output which a Generation Set can reasonably generate as registered under the Distribution Data Registration Code,</td>
</tr>
<tr>
<td>National Electricity Transmission System Demand</td>
<td>The amount of electricity supplied from the Grid Supply Points plus:- (a) that supplied by Embedded Large Power Stations, and (b) that supplied by Embedded Transmission System, and (c) exports from the National Electricity Transmission System across External Interconnections, and (d) National Electricity Transmission System losses, and, for the purposes of this definition, includes the Demand taken by Station Transformers and Pumped Storage Units.</td>
</tr>
<tr>
<td>NGC</td>
<td>National Grid Electricity Transmission plc.</td>
</tr>
<tr>
<td>National Consumer Council (NCC)</td>
<td>The body established under section 2 of the Utilities Act 2000.</td>
</tr>
<tr>
<td>Normal Operating Frequency</td>
<td>The number of Alternating Current cycles per second, expressed in Hertz at which the System normally operates, ie 50 Hertz.</td>
</tr>
<tr>
<td>Offshore</td>
<td>Means in Offshore Waters, as defined in Section 90(9) of the Energy Act 2004.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Offshore Transmission Implementation Plan</td>
<td>As defined in the Transmission Licence</td>
</tr>
<tr>
<td>Offshore Transmission Licensee</td>
<td>The holder of a licence granted under Section 6 (1)(b) of the Act excluding NGC, SPT and SHETL.</td>
</tr>
<tr>
<td>Offshore Transmission System</td>
<td>Has the meaning set out in the Grid Code.</td>
</tr>
<tr>
<td>Onshore Transmission Licensees</td>
<td>NGC, SHETL and SPT</td>
</tr>
<tr>
<td>Onshore Transmission System</td>
<td>Has the meaning set out in the Grid Code.</td>
</tr>
<tr>
<td>Operation</td>
<td>A scheduled or planned action relating to the operation of the System.</td>
</tr>
<tr>
<td>Operation Diagrams</td>
<td>Diagrams which are a schematic representation of the HV Apparatus and the connections to all external circuits at a Connection Point, incorporating its numbering, nomenclature and labelling.</td>
</tr>
<tr>
<td>Operational Boundary</td>
<td>The boundary between the Apparatus operated by the DNO or a User and the Apparatus operated by Other Authorised Distributor(s) or other User(s), as specified in the relevant Site Responsibility Schedule.</td>
</tr>
<tr>
<td>Operational Data (OD)</td>
<td>Information to be supplied pursuant to the Distribution Operating Codes and as set out in the Schedules to the DDRC.</td>
</tr>
<tr>
<td>Operational Day</td>
<td>The period from 0500 hours on one day to 0500 on the following day.</td>
</tr>
<tr>
<td>Operational Effect</td>
<td>Any effect on the Operation of the relevant other System which causes the National Electricity Transmission System or DNO’s Distribution System or the System of the other User or Users, as the case may be, to operate (or be at a materially increased risk of operating) differently from the way in which they would or may have operated in the absence of such an effect.</td>
</tr>
<tr>
<td>Operational Planning</td>
<td>The procedure set out in Distribution Operating Code DOC2 comprising, through various timescales, the co-ordination of planned outages of Users’ Plant and Apparatus.</td>
</tr>
<tr>
<td>Operational Planning Phase</td>
<td>The period from 8 weeks to 3 years inclusive ahead of real time operation.</td>
</tr>
</tbody>
</table>
Other Authorised Distributor: A User authorised by Licence or exemption to distribute electricity and having a User Distribution System connected to the DNO’s Distribution System.

Output Usable or OU: That portion of Registered Capacity which is not unavailable due to a Planned Outage or breakdown.

Ownership Boundary: The electrical boundary between the Equipment owned by one DNO or User and the Equipment owned by another User.

Partial Shutdown: The same as a Total Shutdown except that all generation has ceased in a separated part of the Total System and there is no electricity supply from External Interconnections or other parts of Total System to that part of the Total System and, therefore, that part of the Total System is shutdown with the result that it is not possible for that part of the Total System to begin to function again without NGC’s directions relating to a Black Start.

Peak Demand: The highest level of Demand recorded/forecast for a 12-month period, as specified in the relevant sections of the Distribution Code.

Phase (Voltage) Unbalance: The ratio (in percent) between the rms values of the negative sequence component and the positive sequence component of the voltage.

Planned Outage: An outage of Generating Plant or of part of the National Electricity Transmission System or of part of a Distribution System.

Plant: Fixed and movable items used in the generation and/or supply and/or transmission of electricity other than Apparatus.

Power Factor: The ratio of Active Power to apparent power (apparent power being the product of voltage and alternating current measured in volt-amperes and standard multiples thereof, ie VA, kVA, MVA).

Power Island: Generation Sets at an isolated Power Station, together with complementary local Demand. In Scotland a Power Island may include more than one Power Station.

Power Station: An installation comprising one or more Generation Sets (even where sited separately) and/or controlled by the same Generator and which may reasonably be considered as being managed as one Power Station.

Preliminary Project Planning Data: Data relating to a proposed User Development at the time the User applies for a Connection Agreement but before an offer is made.

Programming Phase: The period between the Operational Planning Phase and the Control Phase. It starts at the 8 weeks ahead stage and finishes at 17:00 on the day ahead of real time.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection</td>
<td>The provisions for detecting abnormal conditions in a System and initiating fault clearance or actuating signals or indications.</td>
</tr>
<tr>
<td>Qualifying Standard</td>
<td>Electrical standards in use by DNOs and included in the Distribution Code Review Panel’s governance procedures, and falling into one of the categories below:</td>
</tr>
<tr>
<td></td>
<td>i. Annex 1 Standard</td>
</tr>
<tr>
<td></td>
<td>ii. Appendix 2 Standard</td>
</tr>
<tr>
<td></td>
<td>iii. Individual DNO Standard</td>
</tr>
<tr>
<td>Reactive Power</td>
<td>The product of voltage and current and the sine of the phase angle between them which is normally measured in kilovar (kVar) or megavar (MVAr).</td>
</tr>
<tr>
<td>Registered Capacity</td>
<td>The normal full load capacity of a Generation Set as declared by the Generator less the MW consumed when producing the same; ie for all Generators, including Customer With Own Generation, this will relate to the maximum level of Active Power deliverable to the DNO’s Distribution System.</td>
</tr>
<tr>
<td></td>
<td>For Generation Sets connected to the DNO’s Distribution System via an inverter, the inverter rating is deemed to be the Generation Set’s rating.</td>
</tr>
<tr>
<td>Registered Data</td>
<td>Data referred to in the schedules to the Distribution Data Registration Code.</td>
</tr>
<tr>
<td>Remote Transmission Assets</td>
<td>Any Plant and Apparatus or meters owned by NGC which:</td>
</tr>
<tr>
<td></td>
<td>a) are Embedded in the DNO’s Distribution System and which are not directly connected by Plant and/or Apparatus owned by NGC to a sub-station owned by NGC; and</td>
</tr>
<tr>
<td></td>
<td>b) are by agreement between NGC and the DNO operated under the direction and control of the DNO.</td>
</tr>
<tr>
<td>Requesting Control Person</td>
<td>Pursuant to DOC8, the person requesting Safety Precautions at an Operational Boundary.</td>
</tr>
<tr>
<td>Safety From The System</td>
<td>That condition which safeguards persons working on or testing Apparatus from the dangers which are inherent in working on items of Apparatus which are used separately or in combination in any process associated with the generation, transmission or distribution of electricity.</td>
</tr>
<tr>
<td>Safety Management System</td>
<td>The procedure adopted by the DNO or a User to ensure the safe Operation of the System and the safety of personnel required to work on that System.</td>
</tr>
<tr>
<td>Safety Precautions</td>
<td>The procedures specified within a Safety Management System.</td>
</tr>
</tbody>
</table>
Safety Rules
The rules or procedure of the DNO or a User to ensure Safety From The System.

Scheduling
The procedure for determining intended usage of Generating Plant.

Secretary of State
Has the same meaning as in the Act.

SHETL
Scottish Hydro-Electric Transmission Limited

Significant Incident
An Event on the Transmission System or DNO’s Distribution System or in a User’s System which has or may have a significant effect on the System of others.

Site Responsibility Schedule
A schedule defining the ownership, operation and maintenance responsibility of Plant and Apparatus at a Connection Point of the DNO.

Small Power Station
A Power Station which is connected to a System notionally connected to a Grid Supply Point in:

a. NGC’s Transmission Area with a Registered Capacity of less than 50MW;

b. SP Transmission Limited’s Transmission Area with a Registered Capacity of less than 30MW;

c. Scottish Hydro-Electric Transmission Limited’s Transmission Area with a Registered Capacity of less than 10 MW.

SPT
Scottish Power Transmission Limited

Standard Planning Data (SPD)
General information required by the DNO under the Distribution Planning Code.

Standby
The supply of electricity by a Supplier to a Customer on a periodic or intermittent basis to make good any shortfall between the Customer’s total supply requirements and that met by his own generation.

Superimposed Signals
Those electrical signals present on a Distribution System for the purposes of information transfer.

Supplier
(a) A person supplying electricity under an Electricity Supply Licence; or
(b) A person supplying electricity under exemption under the Act; in each case acting in its capacity as a supplier of electricity to Customers in Great Britain.

Supply Agreement
An agreement for the supply of electricity made between a Supplier and a consumer of electricity.

System
An electrical network running at various voltages.
<table>
<thead>
<tr>
<th><strong>System Control</strong></th>
<th>The administrative and other arrangements established to maintain as far as possible the proper safety and security of the System.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Incident Centre</strong></td>
<td>A centre set up by the DNO pursuant to the declaration of a Joint System Incident, under DOC 9, to assume control of the incident.</td>
</tr>
<tr>
<td><strong>System Stability</strong></td>
<td>The ability of the System for a given initial operating condition to regain a state of operating equilibrium after being subjected to a given disturbance, with most System variables being within acceptable limits so that practically the whole System remains intact.</td>
</tr>
<tr>
<td><strong>System Test</strong></td>
<td>That test or tests which involve simulating conditions or the controlled application of irregular, unusual or extreme conditions on the Total System or any part of it, but not including routine testing, commissioning or recommissioning tests.</td>
</tr>
<tr>
<td><strong>Test Coordinator</strong></td>
<td>A suitably qualified person appointed to coordinate System Test pursuant to DOC12.</td>
</tr>
<tr>
<td><strong>Test Panel</strong></td>
<td>A panel, the composition of which is detailed in DOC12, and which will be responsible for formulating System Test proposals and submitting a test programme.</td>
</tr>
<tr>
<td><strong>Top - Up</strong></td>
<td>The supply of electricity by any Supplier to the Customer on a continuing or regular basis to make good any shortfall between the Customer’s total supply requirements and that met from other sources.</td>
</tr>
<tr>
<td><strong>Total Shutdown</strong></td>
<td>The situation existing when all generation has ceased and there is no electricity supply from External Interconnections and therefore the Total System has shutdown with the result that it is not possible for the Total System to begin to function again without NGC’s directions relating to a Black Start.</td>
</tr>
<tr>
<td><strong>Total System</strong></td>
<td>The National Electricity Transmission System and all Systems of Users of this National Electricity Transmission System in Great Britain and Offshore.</td>
</tr>
<tr>
<td><strong>Transmission Licence</strong></td>
<td>The licence granted under Section 6(1)(b) of the Act.</td>
</tr>
<tr>
<td><strong>Transmission Licensee</strong></td>
<td>Any Onshore Transmission Licensee or Offshore Transmission Licensee.</td>
</tr>
<tr>
<td><strong>Transmission System</strong></td>
<td>Has the same meaning as the term &quot;licensee's transmission system&quot; in the Transmission Licence of a Transmission Licensee.</td>
</tr>
<tr>
<td><strong>Unmetered Supply</strong></td>
<td>A supply of electricity to premises which is not, for the purposes of calculating charges for electricity supplied to the Customer at such premises, measured by metering equipment.</td>
</tr>
</tbody>
</table>
User

A term used in various sections of the Distribution Code to refer to the persons using the DNO’s Distribution System, more particularly identified in each section of the Distribution Code, including for the avoidance of doubt the OTSO for Embedded Transmission System.

User Development

Either a User's Plant and/or Apparatus and/or System to be connected to the DNO’s Distribution System, or a modification relating to a User's Plant and/or Apparatus and/or System already connected to the DNO’s Distribution System, or a proposed new connection or modification to the connection within the User’s System.

Voltage Reduction

The method to temporarily control Demand by reduction of System voltage.

Weekly Average Cold Spell (ACS) Condition

That particular combination of weather elements that gives rise to a level of Peak Demand within a week, taken to commence on a Monday and end on a Sunday, which has a particular chance of being exceeded as a result of weather variation alone. This particular chance is determined such that the combined probabilities of Demand in all weeks of the year exceeding the annual Peak Demand under Annual ACS Conditions is 50%, and in the week of maximum risk the weekly Peak Demand under Weekly ACS Conditions is equal to the annual Peak Demand under Annual ACS Conditions.

DGD 2. CONSTRUCTION OF REFERENCES

In this Distribution Code:-

(i) The Table of contents, the Guide and headings are inserted for convenience only and shall be ignored in construing the Distribution Code.

(ii) Unless the context otherwise requires, all references to a particular paragraph, sub-paragraph, Annex, Appendix or Schedule shall be a reference to that paragraph, sub-paragraph, Annex, Appendix or Schedule in or to that part of the Distribution Code in which the reference is made.

(iii) Unless the context otherwise requires the singular shall include the plural and vice versa, references to any gender shall include any individual, body corporate, unincorporated association, firm or partnership and any other legal entity.

(iv) References to the words “include” or “including” are to be construed without limitation to the generality of the preceding words.

(v) Unless there is something in the subject matter or the context which is inconsistent therewith, any reference to an Act of Parliament or any Section of or Schedule to, or other provision of an Act of Parliament shall be construed at the particular time, as including a reference to any modification, extension or re-enactment thereof then in force and to all instruments, orders and regulations then in force and made or deriving validity from the relevant Act of Parliament.
References to “in writing” or “written” include typewriting, printing, lithography and other modes of reproducing words in a legible and non-transitory form and, except where otherwise stated, includes suitable means of electronic transfer, such as electronic mail. In all cases the form of notification and the nominated persons or departments and addresses of the sender and recipient of the data or information shall be agreed by the DNO and User and the sender shall be able to confirm receipt of the information by the recipient. In the case of electronic transfer the sender and recipient shall be able to reproduce the information in non-transitory form.

Where the Distribution Glossary and Definitions refers to any word or term which is more particularly defined in a part of the Distribution Code, the definition in that part of the Distribution Code will prevail over the definition in the Distribution Glossary and Definitions in the event of any inconsistency.

A cross reference to another document or part of the Distribution Code shall not of itself impose any additional or further or co-existent right in the part of the text where such cross-reference is contained.

Nothing in the Distribution Code is intended to or shall derogate from the DNO’s statutory or licence obligations.
ANNEX 1

(This Annex forms part of the Distribution Code technical requirements)

Distribution Glossary and Definitions


1  Engineering Recommendation G5/4-1
   Planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission and distribution systems in the United Kingdom.

2  Engineering Recommendation G12/3
   Requirements for the application of protective multiple earthing to low voltage networks.

3  Engineering Recommendation G59/3
   Recommendation for the connection of generating plant to the distribution systems of licensed distribution network operators

4  (a)  Engineering Recommendation P2/6
   Security of Supply.
   (b)  EM7907
   Distribution planning standards of voltage and of security of supply. (Parts of Scottish Hydro Electric Power Distribution Ltd Area)

5  Engineering Recommendation P14
   Preferred switchgear ratings.

6  Engineering Recommendation P24
   AC traction supplies to British Rail.

7  Engineering Recommendation P25
   The short circuit characteristics of electricity boards low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V single phase supplies up to 100A.

8  Engineering Recommendation P26/1
   The estimation of the maximum prospective short circuit current for three phase 415V supplies.

9  Engineering Recommendation P28
   Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment in the United Kingdom.

10 Engineering Recommendation P29
   Planning limits for voltage unbalance in the United Kingdom for 132kV and below.
ANNEX 1

11 **Technical Specification 41-24 November 2009**
Guidance for the design, installation, testing and maintenance of main earthing systems in substations

12 **Engineering Recommendation S34**
A guide for assessing the rise of earth potential at substation sites.

13 **Engineering Recommendation G83/2**
Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16 A Per Phase) In Parallel With Public Low-Voltage Distribution Networks.
DISTRIBUTION CODE INTRODUCTION (DIN)
DISTRIBUTION INTRODUCTION (DIN)

DIN1 INTERPRETATION

DIN1.1 This Distribution Code has been prepared by the DNOs. Words and expressions printed in bold type are listed in the Distribution Glossary and Definitions.

DIN1.2 The DNO, unless indicated otherwise, shall be construed as acting in its Distribution Business capacity.

DIN2 DISTRIBUTION LICENCE DUTY

DIN2.1 The Distribution Licence (Condition 21) requires the DNO in consultation with Authorised Electricity Operators liable to be materially affected thereby to prepare and at all times have in force and implement and comply with a Distribution Code which:

(a) Covers all material technical aspects relating to connections to and the operation and use of the DNO’s Distribution System and the operation of electric lines and electrical Plant and Apparatus connected to the DNO’s Distribution System. The Distribution System of any Other Authorised Distributor shall comply with the Distribution Code at the point of connection with the DNO’s Distribution System.

(b) Is designed so as to:

(i) Permit the development, maintenance, and operation of an efficient, coordinated and economical System for the distribution of electricity.

(ii) Facilitate competition in the generation and supply of electricity.

DIN2.2 The Distribution Code is in the same form for all Users of the same category. In drawing up and implementing the Distribution Code, the Distribution Licence requires that the DNO shall not discriminate against or prefer:

(a) any one or any group of persons, or

(b) the DNO in the conduct of any business other than the Distribution Business, in favour of or against any one other or any other group of persons.

DIN2.3 It is also a requirement of the Distribution Licence that the DNO shall comply with the provisions of the Grid Code so far as applicable to the licensed business, and the Distribution Code is designed to ensure that these obligations can be met by the DNO.

DIN3 SCOPE

The Distribution Code shall be complied with by the DNO and by potential and existing Generators, Suppliers and Customers connected to or seeking connection to the DNO’s Distribution System being referred to as Users as expressly defined in the various parts of the Distribution Code.
DISTRIBUTION INTRODUCTION (DIN)

DIN4 GENERAL REQUIREMENTS

DIN4.1 The **Distribution Code** contains procedures to permit equitable management of day to day technical situations in the Electricity Supply Industry, taking account of a wide range of operational conditions likely to be encountered under both normal and exceptional circumstances. It is nevertheless necessary to recognise that the **Distribution Code** cannot predict and address all possible operational situations. **Users** must therefore understand and accept that the **DNO**, in such unforeseen circumstances, will be required, in the course of the reasonable and prudent discharge of its responsibilities, to act in pursuance of any one or any combination of the following “General Requirements”:

(a) The need to preserve or restore the integrity of the **DNO’s Distribution System** or the **National Electricity Transmission System**

(b) The compliance by the **DNO** with its **Distribution Licence** obligations.

(c) The compliance by others with obligations imposed by Licences issued under the **Act**.

(d) The avoidance of breakdown, separation or collapse (total or partial) of the **DNO’s Distribution System** or the **National Electricity Transmission System** or the **Total System**.

(e) The preservation of safety under all circumstances, including the prevention of personal injury.

(f) The prevention of damage to **Plant** and/or **Apparatus**.

(g) The achievement of objectives specifically identified in the **Distribution Code**.

(h) The compliance by the **DNO** with the **Grid Code**.

   (i) In the absence of an applicable provision of the **Distribution Code** or any of these General Requirements:

   (i) The application of a policy aimed at the equitable sharing amongst **User** of any temporary restriction that might be necessary in exceptional circumstances, and

   (ii) The application of then current industry practice.

DIN4.2 **Users** shall provide such reasonable co-operation and assistance as the **DNO** may reasonably request in pursuance of the above General Requirements.

DIN5 CODE RESPONSIBILITIES

DIN5.1 The **Distribution Code** sets out procedures and principles governing the **DNO’s** relationship with all **Users** of the **DNO’s Distribution System**.
DISTRIBUTION INTRODUCTION (DIN)

DIN5.2 The DNO and all Users have a duty under this Distribution Code to provide such information and resources as are necessary to facilitate compliance with and implementation of the Distribution Code. The DNO can only plan and operate the DNO’s Distribution System and provide information for the planning and operation of the National Electricity Transmission System, having regard to the requirements which Users have informed the DNO they wish to make of the DNO’s Distribution System. The DNO must be able to rely upon the information which Users have supplied to it and will not be held responsible for any consequences which arise from its reasonable and prudent actions on the basis of such information supplied by any User or Users.

DIN6 CONFIDENTIALITY

The Distribution Code contains procedures under which the DNO’s Distribution Business, in pursuance of its obligation as a DNO, will receive information from Users relating to the intentions of such Users. The DNO shall not, except in pursuance of specific requirements of the Distribution Code, disclose such information to any User or other person without the prior written consent of the provider of the information, subject to the requirements of the Distribution Licence (Condition 39).

DIN7 PUBLICATIONS

The Distribution Code contains references to various Electricity Supply Industry publications which provide guidance on planning and design criteria. A list of the publications referred to is included as an Annex 1 to the Distribution Code.
DISTRIBUTION GENERAL CONDITIONS (DGC)
DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC1 INTRODUCTION

The Distribution Glossary and Definitions apply to all provisions of the Distribution Code. Their objective is to ensure, to the extent possible, that various sections of the Distribution Code work together and work in practice for the benefit of all Users.

DGC2 SCOPE

The Distribution Glossary and Definitions apply to the DNO and to all Users.

DGC3 UNFORESEEN CIRCUMSTANCES

If circumstances not envisaged by the provisions of the Distribution Code should arise, the DNO shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith with all affected Users in an effort to reach agreement as to what should be done. If agreement between the DNO and those Users cannot be reached in the time available, the DNO shall determine what is to be done.

Wherever the DNO makes a determination, it shall do so having regard, wherever possible, to the views expressed by Users and, in any event, to what is reasonable in all the circumstances. Each User shall comply with all instructions given to it by the DNO following such a determination provided that the instructions are consistent with the then current technical parameters of the particular User’s System registered under the Distribution Code. The DNO shall promptly refer all such unforeseen circumstances and any such determination to the Distribution Code Review Panel for consideration in accordance with DGC4.2(e).

DGC4 THE DISTRIBUTION CODE REVIEW PANEL

DGC4.1 The DNOs shall establish and maintain the Panel, which shall be a standing body, to carry out the functions referred to in paragraph DGC4.2.

DGC4.2 The Panel shall:-

(a) Keep the Distribution Code and its working under review, including any necessary requirements for maintaining variations for Scotland and England and Wales;

(b) to minimize the necessary differences in the treatment of issues in Scotland from their treatment in England and Wales;

(c) review all suggestions for amendments to the Distribution Code which the Authority or any User may wish to submit to a DNO for consideration by the Panel from time to time;

(d) publish recommendations as to amendments to the Distribution Code that a DNO or the Panel feels are necessary or desirable and the reasons for the recommendations;

(e) issue guidance in relation to the Distribution Code and its implementation, performance and interpretation when asked to do so by any User; and
consider what changes are necessary to the Distribution Code arising out of any unforeseen circumstances referred to it by the DNO under DGC3.

produce an Annual Report of the activities of the Panel; and

establish and maintain governance arrangements for Qualifying Standards that have a material effect on Users of the Distribution System as follows:

1. national electricity industry standards that implement Distribution Code requirements, and which are listed in Annex 1 of the Distribution Code and form part of the Distribution Code;

2. other national electricity industry standards that have a material affect on Users but do not implement Distribution Code requirements and which do not form part of the Distribution Code technical requirements. The Panel will maintain a list of these standards. For convenience this list is attached as Appendix 2 to the Guide to the Distribution Code; and

3. standards adopted by individual DNOs, which are published as such by those DNOs and which have a material effect on Users;

maintain a detailed procedure for the overall governance arrangements for Qualifying Standards, which shall be agreed by resolution of the Panel from time to time; and

have regard for commercial matters insofar as they interact with the Distribution Code and take into account the commercial implications of Distribution Code provisions when developing modifications to the Distribution Code and Annex 1 Standard and Appendix 2 Standard. However the Panel shall not be required to discuss issues relating solely to commercial matters.

DGC4.3 The Panel shall consist of:-

(a) A Chairman and up to 5 members appointed by the ITCG, at least one of whom will be a member of the Grid Code Review Panel and at least one of whom will be an Independent Distribution Network Operator;

(b) a person appointed by the Authority;

the following members:-

(i) 2 persons representing onshore Generators with Embedded Generating Plant who are BM Participants and are active (ie submitting bid-offer data) in the Balancing Mechanism;

(ii) 2 persons representing onshore Generators with Embedded Generating Plant other than those in (i) above; and

(iii) 2 persons, other than Supplier, representing Users without Generating Plant;

(iv) a person representing the OTSO;

(v) a person representing Suppliers; and
(d) A person representing customers appointed by the NCC.

Each of the above shall be appointed pursuant to the rules issued pursuant to DGC4.4.

DGC4.4 The Panel shall establish and comply at all times with its own Constitution and Rules and procedures relating to the conduct of its business, which Constitution Rules and procedures shall be approved by the Authority and are set out in the “Constitution and Rules of the Distribution Code Review Panel”.

DGC4.5 As part of the DNO’s obligation to review periodically the Distribution Code and its implementation as required by Condition 21 of the DNO’s Distribution Licence, the DNO shall consult all Authorised Electricity Operators liable to be affected in relation to all proposed amendments to the Distribution Code and shall submit all proposed amendments to the Distribution Code to the Panel for discussion prior to such consultation. Such review of the Distribution Code undertaken by the DNO shall involve an evaluation of whether any amendment would better facilitate the achievement of the Distribution Code objectives, as provided in the DNO’s Distribution Licence, and, where the impact on greenhouse gasses is likely to be material, this shall include an assessment of the quantifiable impact of any proposed amendment on greenhouse gas emissions, to be conducted in accordance with any guidance (on the treatment of carbon costs and evaluation of greenhouse gas emissions) as may be issued by the Authority from time to time.

DGC4.6 The DNOs shall establish and maintain a group to be known as the ITCG, which shall be a standing body comprised of representatives of the DNOs to carry out the functions referred to in its own constitution and rules.

DGC4.7 The ITCG shall establish and comply at all times with its own constitution and rules relating to the conduct of its business, which constitution and rules shall be approved by the Authority.

DGC4.8 The DNOs shall fund and share the costs incurred by or on behalf of the DNOs in relation to the operation of the Panel and the ITCG in accordance with the cost apportionment mechanism set out in the constitution and rules of the ITCG.

DGC5 COMMUNICATION BETWEEN THE DNO AND USERS

Unless otherwise specified in the Distribution Code, the methods of operational communication (other than relating to the submission of data and notices) shall be agreed between the DNO and User from time to time. The DNO shall operate an enquiry service for dealing with incidents on the DNO’s Distribution System and interruptions in supply.

DGC6 DATA AND NOTICES

DGC6.1 Data and notices to be exchanged between the DNO and User under the Distribution Code (other than data which is the subject of a specific requirement of the Distribution Code as to the manner of its delivery) shall be delivered in writing in accordance with DGD2 (vi).

DGC6.2 All data items, where applicable, will be referenced to nominal voltage and Frequency unless otherwise stated.
DISTRIBUTION GENERAL CONDITIONS (DGC)

DGC7 OWNERSHIP OF PLANT AND/OR APPARATUS

References in the Distribution Code to Plant and/or Apparatus of a User include Plant and/or Apparatus used by a User under an agreement with a third party.

DGC8 SYSTEM CONTROL

Where a User’s System (or part thereof) is, by agreement, under the control of the DNO, then for the purposes of communication and co-ordination in operational timescales the DNO can (for those purposes only) treat that User’s System (or part thereof) as part of the DNO’s Distribution System but as between the DNO and Users, it shall remain to be treated as the User’s System (or part thereof).

DGC9 EMERGENCY SITUATIONS

Users should note that the provisions of the Distribution Code may be suspended in whole or in part during a Security Period as more particularly provided for in the Fuel Security Code, or in accordance with a Civil Emergency Direction issued under a Civil Emergency in accordance with Distribution Operating Code DOC9.

DGC10 DISTRIBUTION CODE RESPONSIBILITIES

The Distribution Code sets out procedures and principles governing the relationship between the DNO and all Users of the DNO’s Distribution System.

DGC11 MODIFICATIONS TO THE DISTRIBUTION CODE

Modifications to the Distribution Code that change the obligations on Users and DNOs in relation to the specification of Equipment that each has to provide to comply with the Distribution Code will not apply retrospectively to Equipment already existing at the date of the implementation of the Distribution Code change, unless specifically required in the relevant Distribution Code clause. However, where the DNO or the User makes a material alteration to the relevant Equipment, then the DNO or the User will comply with the requirements of the Distribution Code currently in force at the date of the material alteration.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 1

DPC1  GENERAL INTRODUCTION

DPC1.1  The Distribution Planning and Connection Code specifies the technical and design criteria and the procedures to be applied by the DNO in the planning and development of the DNO’s Distribution System and to be taken into account by Users, as defined in DPC3 below, in the planning and development of their own Systems insofar as the latter affect the operation and use of the DNO’s Distribution System. Developments on the DNO’s Distribution System may have an impact on the National Electricity Transmission System and this will be taken into account in the planning and development of the DNO’s Distribution System and the conditions of the Grid Code complied with as appropriate.

DPC1.2  This Distribution Planning and Connection Code also specifies the technical, design and operational criteria which must be complied with by the Users, defined in DPC3 below connected to, or seeking connection to the DNO’s Distribution System, in the planning and development of their Systems in so far as they affect the DNO’s Distribution System.

DPC1.3  A requirement for reinforcement or extension of the DNO’s Distribution System or the National Electricity Transmission System may arise due to the requirements of a User or for a number of other reasons including, but not limited to:

(a) A development on a User’s System already connected to the DNO’s Distribution System as a User Development.

(b) The introduction of a new Connection Point between a User’s System and the DNO’s Distribution System.

(c) Transient, or steady state stability considerations.

(d) The development of an existing, or the connection of a new Customer.

(e) The cumulative effect of any combination of the above.

DPC1.4  Accordingly, the reinforcement or extension of the DNO’s Distribution System or the National Electricity Transmission System may involve work:

(a) At the Connection Point between a User’s System and the DNO’s Distribution System.

(b) On distribution or transmission lines or substations or other facilities which join the Connection Point to the remainder of the DNO’s Distribution System or the National Electricity Transmission System.

(c) At or between points on the DNO’s Distribution System remote from the Connection Point.
DPC1.5 The time required for the planning and development of the DNO’s Distribution System and any consequential requirement of the DNO’s interface with the National Electricity Transmission System will depend on the type and extent of the necessary reinforcement and/or extension work, the need or otherwise to obtain statutory or other consents by all parties, the associated possibility for a public inquiry and the degree of complexity in undertaking the new work whilst maintaining satisfactory security and quality of supply on the DNO’s Distribution System. The Distribution Licence imposes appropriate timescales on the exchange of information between the DNO and Users.

DPC1.6 Planning Data

DPC1.6.1 Standard Planning Data

Standard Planning Data is that data first to be provided by a User at the time of an application for a Connection Agreement. It comprises data, which is expected normally to be sufficient for the DNO to investigate the impact on the DNO’s Distribution System of any User Development associated with an application by the User for a Connection Agreement. The DNO will inform Users where more detailed information is required.

DPC1.6.2 Detailed Planning Data

Detailed Planning Data comprises additional, more detailed, data not normally expected to be required by the DNO to investigate the impact on the DNO’s Distribution System of any User Development associated with an application by the User for a Connection Agreement.

The User may, however, be required by the DNO to provide the Detailed Planning Data before the DNO can make an offer for a Connection Agreement. The DNO shall only request Detailed Planning Data where it considers the provision of such data to be necessary and in such cases the DNO shall specify which elements of Detailed Planning Data are required.

DPC1.6.3 Standard Planning Data and Detailed Planning Data requirements are specified for different User Developments of different types in DPC5 and DPC7 of this Distribution Planning and Connection Code and summarised in the Distribution Data Registration Code.

DPC1.6.4 Estimated Data

Where data is not available at the feasibility stage or preliminary stage of a User Development then the User may provide a reasonable estimate of the data to be requested by the DNO and in such cases the data shall be identified as estimated data by the User. Estimated data supplied by Users in pursuance of this Distribution Planning and Connection Code should, where practicable, be replaced by actual validated values prior to connection.

DPC1.6.5 Assumed Data

Where data is not available or has not been provided by the User at the feasibility stage or preliminary stage of a User Development then the DNO may make reasonable assumptions of the data required for assessment of the User Development and in such cases the User shall be notified of the assumed values.
adopted. Where the DNO has notified the User that assumed data has been adopted by the DNO in pursuance of this Distribution Planning and Connection Code then the User should, where practicable provide actual validated values to replace the assumed values prior to connection.

DPC1.7 Status of Planning Data

It is in the interests of all Users to initiate early discussion with the DNO regarding any proposed User Development, which may have an impact on the DNO’s Distribution System.

For the purposes of this Distribution Planning and Connection Code it is considered that development will consist of four stages: -

(a) Feasibility Project Stage

At this optional stage the User will be considering a User Development. The DNO will be pleased to conduct a short meeting to discuss the User’s requirements and provide guidance on the likely implications for the DNO’s Distribution System.

If at this stage the User requires further information then the DNO will request Standard Planning Data from the User and provide a feasibility assessment identifying items of significant cost to the extent permitted by the information provided by the User. In accordance with the DNO’s Statement of Charges a charge will be payable by any potential User for such an assessment.

At the feasibility project stage a number of iterative studies may be carried out by the DNO at the request of the User (or by the User) to identify opportunities for connection and corresponding costs and technical issues. The Feasibility Project Data requested by the DNO from the User to carry out these feasibility studies may include both Standard Planning Data and Detailed Planning Data depending on the complexity of the assessment studies required to be carried out by the DNO.

(b) Preliminary Project Stage

At this stage the User will have submitted an application for a Connection Agreement. The Preliminary Project Planning Data requested by the DNO from the User for assessing the connection and costs may include both Standard Planning Data and Detailed Planning Data.

c) Committed Project Stage

At this stage a Connection Agreement will have been established. The Committed Project Planning Data on which the Connection Agreement is based may include both Standard Planning Data and Detailed Planning Data.

(d) Registered Project Stage

At this stage the connection will be physically established. The Registered Data for the connection shall include replacements for estimated and assumed values, where practicable, using validated actual values and updated forecasts for future data items.
DPC 1.8 Reference is made in the Distribution Planning and Connection Code to the DNO supplying information or advice to Users. For the avoidance of doubt, unless the context otherwise requires, such information or advice will be furnished by the DNO upon request by the User (whether during the application for connection process or otherwise).

DPC 1.9 The provisions of the Distribution Planning and Connection Code shall, subject to DPC 1.8, be applicable to:

(a) All existing connections as at the date of commencement of DNO’s Distribution Licence.

(b) All new or modified connections thereafter.

DPC 1.10 In considering the approval of existing connections at the date of commencement of its Distribution Licence, the DNO shall have regard to the fact that previous changes in technical and design standards have not been applied retrospectively in every case, and the DNO shall not seek, under the terms of these Distribution Planning and Connection Code Conditions, to impose retrospective changes where these had not been required in the past, except where the DNO can reasonably demonstrate that significant change has occurred to conditions which existed when the matter was previously considered by the DNO or its predecessors.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 2

DPC2 OBJECTIVES

The objectives of the Distribution Planning and Connection Code are to:-

(a) Enable the DNO’s Distribution System to be planned, designed and constructed to operate economically, securely and safely.

(b) Facilitate the use of the DNO’s Distribution System by others and to specify a standard of supply to be provided.

(c) Establish technical conditions which facilitate the interfacing of Systems at points of entry to and exit from the DNO’s Distribution System.

(d) Formalise the exchange of System planning data.

(e) Provide sufficient information for a User to assess opportunities for connection and to plan and develop his System such as to be compatible with the DNO’s Distribution System.
DPC3 SCOPE

DPC3.1 The Distribution Planning and Connection Code specifies the planning, design and connection requirements for Distribution Systems owned by the DNO and for connections to those Systems.

DPC3.2 The Users to whom the Distribution Planning and Connection Code applies are those who use or intend to use the DNO’s Distribution System and comprise the following:

(a) Embedded Generators.

(b) Suppliers.

(c) Customers including those with Unmetered Supplies who are connected to the DNO’s Distribution System.

(d) Other Authorised Distributors connected to the DNO’s Distribution System.

(e) Meter Operators which perform services in respect of Equipment connected to the DNO’s Distribution System.
DPC4 DESIGN PRINCIPLES AND STANDARDS

DPC4.1 Introduction

DPC4.1.1 Planning criteria are based on the requirement to comply with statutory requirements, Distribution Licence conditions and other obligations placed on the DNO and Users.

DPC4.1.2 The DNO has a duty to develop and maintain an efficient, secure and co-ordinated System of electricity supply that is both economical and safe.

DPC4.1.3 DPC4 sets out current principles and standards to be applied in the design of the DNO’s Distribution System and any User connections to that System. Each scheme for reinforcement or modification of the DNO’s Distribution System is individually designed in the light of economic and technical features associated with the particular System limitations under consideration.

DPC4.1.4 Nothing in DPC4 is intended to inhibit design innovation. DPC4 is, therefore, based upon the performance requirements of the DNO’s Distribution System necessary to meet the above criteria.

DPC4.1.5 The technical and design criteria applied in the planning and development of the DNO’s Distribution System are listed in Annex 1 to the Distribution Code. These standards may be subject to revision from time to time in accordance with the provision of the Distribution Licence.

DPC4.2 Standard of Supply

DPC4.2.1 Security

In accordance with the Condition 5 of the Distribution Licence, DNOs shall plan and develop their DNO’s Distribution Systems to a standard not less than that set out in DGD Annex 1 Item 4, Engineering Recommendation P2/6 – “Security of Supply” or such other standard of planning as DNOs may, with the approval of the Authority, adopt from time to time

In accordance with the Distribution Licence Scottish Hydro Electric Power Distribution Ltd shall plan and develop its DNO’s Distribution System in Scotland to a standard set out in EM7907. Engineering Recommendation P2/6 – “Security of Supply” has been modified by Scottish Hydro Electric Power Distribution Ltd as EM7907 and this is accepted by the Authority.

DPC4.2.2 Frequency and Voltage

DPC4.2.2.1 The DNO’s Distribution System and any User connections to that System shall be designed to enable the Normal Operating Frequency and voltages supplied to Customers to comply with the ESQCR.

DPC4.2.2.2 The Frequency of the DNO’s Distribution System shall be nominally 50 Hz and shall normally be controlled within the limits of 49.5 - 50.5 Hz in accordance with principles outlined in the ESQCR.
DPC4.2.2.3 In exceptional circumstances, System Frequency could rise to values of the order of 52 Hz or fall to values of the order of 47 Hz. Sustained operation outwith the range 47 - 52 Hz is not taken into account in the design of Plant and Apparatus.

DPC4.2.2.4 Any extension or connection to the DNO’s Distribution System shall be designed in such a way that it does not adversely affect the voltage control employed on the DNO’s Distribution System. Information on the voltage regulation and control arrangements will be made available by the DNO if requested by the User.

DPC4.2.3 Voltage Disturbances and Harmonic Distortion

DPC4.2.3.1 General
Under fault and circuit switching conditions the rated Frequency component of voltage may fall or rise transiently. The fall or rise in voltage will be affected by the method of earthing of the neutral point of the DNO’s Distribution System and voltage may fall transiently to zero at the point of fault. BS EN 50160:2010 ‘Voltage Characteristics of Electricity Supplied by Public Distribution Systems’, as amended from time to time, contains additional details of the variations and disturbances to the voltage which shall be taken into account in selecting Equipment from an appropriate specification for installation on or connected to the System.

DPC4.2.3.2 Voltage Disturbances
Distortion of the System voltage waveform, caused by certain types of Equipment, may result in annoyance to Users of the DNO’s Distribution System or damage to connected Apparatus. In order to limit these effects the following shall apply to Users’ loads connected to the DNO’s Distribution System:

(a) Voltage fluctuations shall comply with the limits set out in DGD Annex 1, Item 9 Engineering Recommendation P28, “Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment in the United Kingdom”.

(b) The harmonic content of a load shall comply with the limits set out in DGD Annex 1, Item 1 Engineering Recommendation G5/4-1, “Planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission and distribution systems in the United Kingdom.”

(c) Phase (Voltage) Unbalance shall comply with the levels laid down in DGD Annex 1, Item 10 Engineering Recommendation P29, “Planning limits for voltage unbalance in the United Kingdom for 132kV and below”.

(d) Traction supplies shall comply as appropriate with the requirements of DGD Annex 1, Item 6. Engineering Recommendation P24 “A.C. traction supplies to British Rail”.

Under certain circumstances the DNO may agree to other limits or levels.
DPC4.2.3.3 Voltage Step Changes

The effect of voltage step changes caused by the connection and disconnection of User’s Equipment or Customer’s Demand to or from the DNO’s Distribution System must be considered and be subject to limits to avoid unacceptable voltage changes being experienced by other Customers connected to the DNO’s Distribution System. The magnitude of a voltage step change depends on the method of voltage control, types of load connected and the presence of local generation. Typical limits for voltage step changes caused by the connection and disconnection of User’s Equipment or Customer’s Demand to the DNO’s Distribution System, are ±3% for infrequent planned switching events or outages (in accordance with Engineering Recommendation P28). For unplanned outages such as faults it will generally be acceptable to design to a voltage step change of ±10%.

For the purpose of the Distribution Code a voltage step change should be considered to be the change from the initial voltage level to the resulting voltage level after all the Generation Set automatic voltage regulator and static VAR compensator actions, and transient decay (typically 5 seconds after the fault clearance or system switching) have taken place, but before any other automatic or manual tap-changing and switching actions have commenced.

The voltage depression arising from transformer magnetising inrush current is a short-time phenomenon not generally easily captured by the definition of voltage step change used above. In addition the size of the depression is dependent on the point on wave of switching, and the duration of the depression is relatively short, in that the voltage recovers substantially in under one second.

User’s installations should be designed such that transformer magnetising inrush current associated with normal routine switching operations does not cause voltage fluctuations outside those in Engineering Recommendation P28 (ie a maximum of ±3%). To achieve this it may be necessary install switch gear so that sites containing multiple transformers can be energised in stages.

Situations will arise from time to time when complete sites including a significant presence of transformers are energised as a result of post fault switching, post maintenance switching, or carrying out commissioning tests on the DNO’s Distribution System or on Users’ Systems. In these situations it will generally be acceptable to design to an expected depression of around ±10%, recognizing that a worst case energization might cause a larger depression, on the basis that such events are considered to be rare and it is difficult to predict the exact depression because of the point on wave switching uncertainty. Should these switching events become more frequent than once per year, then the design should revert to aiming to limit depressions to less than 3%.

DPC4.2.4 Auto-reclosing and Single Phase Protection Operation

In connecting to the DNO’s Distribution System the User should be aware that auto-reclosing or sequential switching features may be in use on the DNO’s Distribution System. The DNO will on request provide details of the auto-reclosing or sequential switching features in order that the User may take this into account in the design of the User System, including Protection arrangements.
Users should be aware that the Protection arrangements on some Distribution Systems may cause disconnection of one phase or two phases only of a three phase supply for certain types of fault.

DPC4.3 Design Principles

This section sets out design principles for Users (excluding Generators, the OTSO and Users with Unmetered Supply), connected at Low Voltage and having single phase or three phase supplies protected by fuse(s) or other device(s) rated at 100 amps or less.

DPC4.3.1 Any User’s installation which complies with the provisions of the Requirements of Electrical Installations BS 7671 as amended from time to time, shall be deemed to comply with the requirements of the Distribution Code as regards design and safety.

DPC4.3.2 On the request of a User the DNO will provide such information, as may be reasonably required, on the design and other characteristics of the DNO’s Distribution System.

Guidance on the short circuit characteristics of the Low Voltage System and associated supplies is provided in Electricity Supply Industry engineering publications, including Items 7 and 8 in Annex 1 Engineering Recommendation P25, “The short circuit characteristics of electricity board’s low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V Single Phase supplies up to 100 Amps”, and Engineering Recommendation P26/1, “The estimation of the maximum prospective short circuit current for three phase 415V supplies”.

Design practice for protective multiple earthing is detailed in the Electricity Supply Industry engineering publications (including Item 2 in Annex 1 Engineering Recommendation G12/3, “Application of protective multiple earthing to low voltage networks”) and in the references contained in those publications.

The DNO’s information requirements are detailed in DPC5.2.1.

DPC4.4 Design Principles for all other Users not included in DPC4.3

DPC4.4.1 Specification of Equipment, Overhead Lines and Underground Cables

(a) The principles of design, manufacture, testing and installation of distribution Equipment, overhead lines and underground cables, including quality requirements, shall conform to applicable statutory obligations and shall comply with relevant CENELEC standards, IEC publications, European and British Standards. Further advice will be made available upon request to the DNO.
(b) The documents specified in paragraph (a) contain options for purchaser selection which together with other requirements that are necessary to meet System design needs, shall be specified so as to provide performances and ratings in line with Electricity Supply Industry (ESI) Technical Specifications (some of which are published as Electricity Supply Industry (ESI) Standards), British Electricity Board Specifications, Engineering Recommendations and Area Chief Engineers (ACE) Reports and Engineering Technical Reports and Electricity Supply Industry (ESI) documents as listed in Annex 1 of the Distribution Code or such other specifications as the DNO may adopt from time to time by agreement with the Authority.

(c) The specifications of Equipment, overhead lines and cables shall be such as to permit Operation of the DNO’s Distribution System within the Safety Management System of the DNO, details of which will be made available by the DNO upon request.

(d) Equipment shall be suitable for use at the operating Frequency, within the intended operating voltage range and at the design short-circuit rating of the DNO’s Distribution System to which it is connected having due regard to fault carrying capabilities and making and breaking duties. In appropriate circumstances, details of the System to which connection is to be made will be provided by the DNO. Guidance on the short circuit characteristics of the three phase Low Voltage system and associated supplies is provided in Electricity Supply Industry engineering publications, including Item 8 in DGD Annex 1 Engineering Recommendation P26/1, “The estimation of the maximum prospective short circuit current for three phase 415V supplies”.

(e) Connections to the DNO’s Distribution System at 132kV may be subject to the requirements of Appendix 2 item 5 (ER P18). DNOs will have network specific complexity limits for Systems operating at voltages below 132kV which they will make available on request.

(f) Cables, overhead lines transformers and other Equipment shall be operated within the thermal rating conditions contained in the appropriate standards, specifications, and other relevant publications, taking into account the intended use. Such information will be made available by the DNO upon request.

(g) The standards, publications and specifications referred to in paragraphs (a) to (f) above are such standards, publications and specifications current at the time that the Plant and/or Apparatus was manufactured (and not commissioned) in the case of Plant and/or Apparatus on the Total System, or awaiting use or re-use. If any such Plant/Apparatus is subsequently moved to a new location or used in a different way, or for a different purpose, or is otherwise modified then such standards, publications and specifications current at the time that the Plant and/or Apparatus was manufactured (and not commissioned) will apply provided that in applying such standards, publications and specifications the Plant and/or Apparatus is reasonably fit for its intended purpose having due regard to the obligations of the DNO and the User under their respective licences.
DPC4.4.2 Earthing

(a) The arrangements for connecting the DNO’s Distribution System with earth shall be designed to comply with the requirements of the ESQCR and relevant European and British Standards. Guidance as to the design of earthing systems is contained in Electricity Supply Industry (ESI) engineering publications, including Items 11, and 12 in DGD Annex 1 Technical Specification 41-24, “Guidance for the design, installation, testing and maintenance of main earthing systems in substations” and Engineering Recommendation S.34, “A guide for assessing the rise of earth potential at substation sites”. Additional requirements associated with Generating Plant are given in DPC7.

(b) The method of earthing of the DNO’s Distribution System, for example, whether it is connected solidly to earth or through an impedance, shall be advised by the DNO. The specification of associated Equipment shall meet the voltages which will be imposed on the Equipment as a result of the method of earthing.

(c) Design practice for protective multiple earthing is detailed in the Electricity Supply Industry (ESI) engineering publications including Item 2 DGD Annex 1 Engineering Recommendation G12/3, “Application of protective multiple earthing to low voltage networks”, and in the references contained in those publications.

(d) Users shall take precautions to limit the occurrence and effects of circulating currents in respect of the neutral points of any interconnected system (eg where there is more than one source of energy.)

DPC4.4.3 Voltage Regulation and Control

Any extension or connection to the DNO’s Distribution System shall be designed in such a way that it does not adversely affect the voltage control employed by the DNO’s Distribution System. Information on the voltage regulation and control arrangements will be made available by the DNO if requested by the User.

DPC4.4.4 Protection

(a) The DNO’s Distribution System and the System of any User connected to the DNO’s Distribution System shall incorporate protective devices in accordance with the requirements of the ESQCR.

(b) In order to ensure satisfactory operation of the DNO’s Distribution System, Protection systems, operating times, discrimination, and sensitivity across the Ownership Boundary, as well as testing and maintenance regimes, shall be agreed between the DNO and the User during the application for connection process, and may be reviewed from time to time by the DNO, with the concurrence of the User.
(c) In order to cover a circuit breaker, or **Equipment** having a similar function, failing to operate correctly to interrupt fault current on a **HV System**, back-up protection by operation of other circuit breakers or **Equipment** having a similar function must normally be provided. The **DNO** will advise the **User** if the same is not required. If the **Equipment** providing the back-up protection is owned by the **DNO**, then this **Protection** may be limited to that needed to meet statutory requirements in respect of the **DNO’s Distribution System**.

(d) Unless the **DNO** should advise otherwise, it is not acceptable for **Users** to limit the fault current infeed to the **DNO’s Distribution System** by the use of **Protection** and associated **Equipment** if the failure of that **Protection** and associated **Equipment** to operate as intended in the event of a fault, could cause **Equipment** owned by the **DNO** to operate outside its short-circuit rating.

**DPC4.4.5 Superimposed Signals**

Where **Users** install mains borne signalling equipment it shall comply with BS EN50065 as amended from time to time. Where a **User** proposes to use such equipment to superimpose signals on the **DNO’s Distribution System**, the prior agreement of the **DNO** is required.

**DPC4.5 Network Statements**

**DPC4.5.1** In accordance with Condition 4 of its **Distribution Licence** the **DNO**, on the request of a **User**, will prepare a statement showing present and future circuit capacity, forecast power flows and loading on the part or parts of the **DNO’s Distribution System** specified in the request and **Fault Levels** at each distribution node covered by the request and containing:

a) such further information as shall be reasonably necessary to enable such person to identify and evaluate the opportunities available when connecting to and making use of the part or parts of the licensee’s distribution system specified in the request ;and

b) if so requested, a commentary prepared by the licensee indicating the licensee’s views as to the suitability of the part or parts of the licensee’s distribution system specified in the request for new connections and the distribution of further quantities of electricity.

The **Distribution Licence** sets out conditions on the time scales and charges associated with providing such a statement

**DPC4.5.2** In accordance with Condition 25 of its Distribution Licence the **DNO** will prepare on the request of the **Authority** a statement, also known as the Long Term Development Statement. The form and content of this statement will be specified by the **Authority** and will cover future years on a rolling basis. This statement gives information to assist any person who contemplates entering into distribution arrangements with the **DNO** to identify and evaluate the opportunities for doing so.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 5

DPC5 GENERAL REQUIREMENTS FOR CONNECTION

DPC5.1 Introduction

DPC5.1.1 Distribution Planning and Connection Code (DPC5) ensures that all Users of the DNO’s Distribution System are subject to the same requirements for connection.

DPC5.1.2 Data exchange requirements specified in this Distribution Planning and Connection Code apply to any User Development, which has an impact on the DNO’s Distribution System.

DPC5.1.3 DPC5.2.2 specifies the information required from Users by the DNO in order to ensure that adequate technical provision is made for new supplies or increases in existing load; DPC5.2.2 also applies to Embedded Generators who operate in parallel with the DNO’s Distribution System, where a supply is required from the DNO under normal or emergency conditions. Information required from Embedded Generators, with connections at HV or Low Voltage, in respect of the import of energy to the DNO’s Distribution System, is covered in DPC7. Transfer of Planning Data for Users connected at HV is set out in DPC 8.

DPC5.2 Declaration of Load Characteristics

DPC5.2.1 For supplies at Low Voltage under terms in the Supply Agreement it is possible in most cases to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited data:-

(a) Maximum power requirements (kVA or kW);

(b) Type and electrical loading of Equipment to be connected, eg number and size of motors, cookers, showers, space and water electrical heating arrangements, including details of equipment which is subject to switching by the Supplier; and

(c) The date when the connection is required.

These requirements will be specified on the appropriate application for a connection form obtainable from the DNO.

Should a preliminary examination of this data indicate that more detailed information is required then it shall be provided to the DNO upon request if reasonably required.

Users, shall contact the DNO in advance if it is proposed to make any significant change to the connection, electric lines or electrical Equipment, install or operate any generating equipment or do anything else that could affect the DNO’s Distribution System or require alterations to the connection.

Users shall provide the DNO with any information it asks for about the nature, or use by the User, of electrical equipment on the User’s premises (including that specified in DPC5.2.1 (a), (b), and (c) above). The DNO will only ask for information that is needed by it in relation to its Distribution Licence or the Distribution Code or to comply with the ESQCR or the Act.
DPC5.2.2 The provisions of DPC5.2.1 also apply to supplies other than those at Low Voltage. It may be necessary for the following more comprehensive information, in addition to that detailed in DPC5.2.1, to be provided on request:

DPC5.2.2.1 Standard Planning Data

It is possible in most cases to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited Planning Data which will be specified on the appropriate standard application form obtainable from the DNO:

(a) Point of Connection to the DNO’s Distribution System (geographical and electrical).
(b) The date when connection is required.
(c) Single line diagrams of existing and proposed arrangements of main Plant and Apparatus showing equipment rating.
(d) Type and electrical loading of equipment to be connected, eg number and size of motors, electrical heating arrangements, etc.
(e) Maximum power requirements MVA.
(f) Maximum Active Power Demand (MW).
(g) Maximum and minimum Reactive Power requirements (MVAr).
(h) The maximum Phase (Voltage) Unbalance which the User would expect the Demand to impose on the DNO’s Distribution System.
(i) The maximum harmonic content which will be imposed on the DNO’s Distribution System.
(j) Details of change of Demand (Active Power and Reactive Power).
(k) Details of any load management scheme to be applied by the User on the User System.
(l) Peak Demand profiles at the Exit Point, both 2 hourly on day of User’s Peak Demand and monthly Peak Demand variations.
(m) Three phase short circuit infeed from all sources within the User’s System, based on Generation Set sub-transient reactance and the minimum zero phase sequence impedance of the User’s System.
(n) Standard load profiles

Should a preliminary examination of this data indicate that more detailed information is required then it shall be provided to the DNO on request.

DPC5.2.2.2 Detailed Planning Data

It may be necessary for the User in addition to that in DPC5.2.2.1, to provide the following more comprehensive Detailed Planning Data on request.

In relation to Demand:

(a) Type of load and control arrangements (eg controlled rectifier or large motor drives and type of starter employed).
(b) Maximum load on each phase at the time of Peak Demand
(c) **Demand** profiles (48 x half hour average estimates) for **Active** and **Reactive Power Demand** for the day of the **Exit Point Peak Demand** and for the day of the **National Electricity Transmission System Peak Demand at Annual Average Cold Spell (ACS) Conditions.**

In relation to fluctuating loads:-

(a) The rates of change of **Demand** (**Active Power** and **Reactive Power**) both increasing and decreasing.

(b) The shortest repetitive time interval between fluctuations in **Demand** (**Active Power** and **Reactive Power**).

(c) The magnitude of the largest step changes in **Active Power** and **Reactive Power**, both increasing and decreasing.

In some cases, more detailed information may need to be provided to permit a full assessment of the effect of the **User’s** load on the **DNO’s Distribution System**. Such information may include an indication of the pattern of build up of load and a proposed commissioning programme. This information will be specifically requested by the **DNO** when necessary.

**DPC5.2.3** A **DNO** is only entitled to use any information provided by a **User** under this **Distribution Code** for the purpose of fulfilling its obligations in respect of its **Distribution System** required by the **Distribution Licence** or the **Distribution Code**, including operating the procedures for **Load Managed Areas** and associated Security Restriction Notices specified in the **Distribution Use of System Agreement**.

**DPC5.3** **Connection Arrangements**

**DPC5.3.1** The design of connections between the **DNO’s Distribution System** and **Users** shall be in accordance with the principles set out in **DPC4**, subject to any modification to which the **DNO** may reasonably consent.

**DPC5.3.2** During the application for connection process the **DNO** will agree with the **User** the voltage level to which a **User** will be connected in accordance with its normal practice for the type of load to be supplied. The **DNO** may on occasion specify a different connection voltage from normal in order to avoid potential disturbance caused by the **User’s Apparatus** to other **Users** of the **DNO’s Distribution System** or for other technical reasons or may agree alternative methods for minimising the effects of disturbing loads.

**DPC5.3.3** Before entering into a **Connection Agreement** and before making a connection to a **User** at a **Connection Point**, it will be necessary for the **DNO** to be reasonably satisfied that the **User’s System** at the boundary with the **DNO’s Distribution System** will comply with all appropriate requirements of the **Distribution Code**.

**DPC5.3.4** The **User’s** installation shall comply with the principles expected in Regulation 25(2)(a) of the **ESQCR**, or relevant European and British Standard as appropriate.
DPC5.4 Ownership Boundaries

DPC5.4.1 The point or points at which supply is given or taken between the DNO’s Distribution System and Users will be agreed between the DNO and the User as required. For supplies at Low Voltage the general rule is that the point of supply will be at the outgoing (ie User’s side) terminals of the item of DNO or Meter Operator owned Apparatus where the transition is made to the User’s tails or other User owned Apparatus. For HV supplies, including connections between the DNO and User, and where necessary busbar connected supplies at Low Voltage, the points of supply will be subject to specific agreement between the parties in each case.

DPC5.4.2 The respective ownership of Plant or Apparatus will be recorded in a written agreement between the DNO and the User as required. In the absence of a separate agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.

DPC5.4.3 For supplies to Embedded Generators who operate in parallel with the DNO’s Distribution System and all supplies at HV the DNO will with the User’s agreement prepare a Site Responsibility Schedule and, where determined by the DNO during the application for connection process, Operation Diagrams showing the agreed Ownership Boundary.

The Site Responsibility Schedule shall detail the demarcation of responsibility for safety of persons carrying out work or testing at sites having a Connection Point to the DNO’s Distribution System and/or circuits which cross an Ownership Boundary at any point.

More detailed information on procedures and responsibilities involved in the provision of safety at interfaces between the DNO’s Distribution System and a User’s System is set out in Distribution Operating Code DOC8.

Copies of these documents will be retained by the DNO and the User. Changes in the boundary arrangements proposed by either party must be agreed in advance and will be recorded on the DNO Operation Diagrams.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 6

DPC6 TECHNICAL REQUIREMENTS FOR CONNECTIONS

DPC6.1 Introduction

Distribution Planning and Connection Code DPC6 specifies the technical arrangements required at the Ownership Boundary between the DNO’s Distribution System and the System of the User and is applicable at all voltage levels, but excludes Users (including those with Unmetered Supplies) connected at Low Voltage, without Generation, and protected by fuse(s) or other device(s) rated at 100 amps or less.

DPC6.2 Equipment at the Ownership Boundary

All Equipment at the Ownership Boundary shall meet the design principles contained within DPC4.4.1. Connections for entry to and exit from the DNO’s Distribution System shall incorporate a means of disconnection of the User’s installation by the DNO.

DPC6.3 Protection Requirements

Protection requirements vary widely depending on established practices and the needs of the particular DNO’s Distribution System. The basic requirement in all cases is that Users’ arrangements for Protection at the Ownership Boundary, including types of Equipment and Protection settings, must be compatible with standards and practices on the DNO’s Distribution System, maintaining necessary operating times, sensitivity, discrimination and co-ordination, as specified by the DNO during the application for connection process and which may be reviewed from time to time and complied with by the User.

In particular:

(a) Maximum fault clearance times (from fault current inception to arc extinction) must be within the limits established by the DNO in accordance with Protection and Equipment short circuit rating policy adopted for the DNO’s Distribution System.

(b) In connecting to the DNO’s Distribution System the User should be aware that auto-reclosing or sequential switching features may be in use on the DNO’s Distribution System. The DNO will on request provide details of the auto-reclosing or sequential switching features in order that the User may take this into account in the design of the User System, including Protection arrangements.

(c) Users should also be aware that the Protection arrangements on some DNO’s Distribution Systems may cause disconnection of one phase or two phases only of a three phase supply for certain types of fault.

DPC6.4 Earthing

Earthing of that part of the User’s System that is connected to the DNO’s Distribution System shall comply with the arrangements specified in DPC4.
DPC6.5  **Fault Level Considerations**

DPC6.5.1 The short circuit rating of **User’s Equipment** at the **Connection Point** should be not less than the design **Fault Level** of the **DNO’s Distribution System** to which it is connected. The choice of **Equipment** for connection at **Low Voltage** may take into account attenuation in the service lines as specified in DGD Annex 1, Items 7 and 8, Engineering Recommendation P25, “The short circuit characteristics of electricity board’s low voltage distribution networks and the co-ordination of overcurrent protective devices on 230V single phase supplies up to 100 Amps” and Engineering Recommendation P26/1, “The estimation of the maximum prospective short circuit current for three phase 415V supplies”. The **DNO** in the design of its **System** will take into account the contribution to **Fault Level** of the **User’s** connected **System** and **Apparatus**.

DPC6.5.2 In order to permit these assessments to be carried out information should be exchanged on prospective fault power infeed and X/R ratios where appropriate at points of entry to and exit from the **DNO’s Distribution System**.

DPC6.6  **Capacitive and Inductive Effects**

The **User** shall, when applying to make a connection, provide the **DNO** with information as detailed in DPC8. Details will be required of capacitor banks and reactors connected at **HV** which could affect the **DNO’s Distribution System** and which it is proposed to connect if agreed by the **DNO**. When requested by the **DNO** details shall also be provided of distributed circuit capacitance and inductance. Sufficient detail is required for the following:-

(a) To verify that controlling **Equipment** of the **DNO’s Distribution System** is suitably rated.

(b) To show that the performance of the **DNO’s Distribution System** will not be impaired.

(c) To ensure that arc suppression coils when used by the **DNO** for **System** earthing purposes are correctly installed and operated.

DPC6.7  **Communications and Telemetry Equipment**

DPC6.7.1 Where required by the **DNO** in order to ensure control of the **DNO’s Distribution System**, communications between **Users** and the **DNO** shall be established in accordance with the following. **Users** shall provide and maintain those parts of the communications equipment within their location. Provision of any necessary communications requirements shall be in accordance with the **Connection Agreement** for a specific connection.

DPC6.7.2  **Primary Speech Facility**

**Users** at their own cost shall provide and maintain equipment approved by the **DNO** by means of which routine and emergency communications may be established between the **User** and the **DNO**.

Connection to the **DNO’s** corporate telephone network and any circuit or circuits required to connect the **Users** with the point of connections shall be provided in accordance with the **Connection Agreement**.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

The facilities to be provided by the connection and the signalling and logical requirements for the interface between the Users equipment and the connection to the DNO’s corporate telephone network will be specified in the Connection Agreement.

DPC6.7.3 Telemetry

The User shall provide such voltage, current, frequency, Active Power and Reactive Power pulses and outputs and status points from his System as are considered reasonable by the DNO to ensure adequate System monitoring. The telemetry outstation in such a situation will be provided, installed and maintained by the DNO.

DPC6.7.4 Telecontrol Outstation

If it is agreed between the parties that the DNO shall control the switchgear on the User’s System, the DNO shall install the necessary telecontrol outstation. Notwithstanding the above, it shall be the responsibility of the User to provide the necessary control interface for the switchgear of the User which is to be controlled.

DPC6.7.5 Instructor Facilities

Where required by the DNO, the User shall provide accommodation for special instructor facilities specified by DNO for the receipt of operational messages.

DPC6.7.6 Data Entry Terminals

The User shall accommodate the DNO’s data entry terminals for the purpose of information exchange.

DPC6.7.7 System Monitoring

Monitoring equipment is provided on the DNO’s Distribution System to enable the DNO to monitor dynamic performance conditions. Under the requirements of the Grid Code, Generation Sets and Power Stations will need to provide signals for monitoring purposes. Where this monitoring equipment requires input signals from the User’s side of the DNO/User Ownership Boundary, the User shall be responsible for the provision of suitable signals in accordance with the Connection Agreement.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 7

DPC7 REQUIREMENTS FOR EMBEDDED GENERATORS

DPC7.1 Introduction

DPC7.1.1 This Distribution Planning and Connection Code DPC7 is applicable to all Embedded Generators including a Customer With Own Generation and Other Authorised Distributors, having Generating Plant operating or capable of operating in parallel with the DNO’s Distribution System.

DPC7.1.2 In addition to meeting the requirements of DPC7, Embedded Generators will need to meet the requirements of other relevant sections of the Distribution Code.

DPC7.1.3 For the avoidance of doubt a User who has installed a Generation Set in accordance with Item 13 DGD Annex 1 Engineering Recommendation G83/2 (“Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16 A Per Phase) in Parallel With Public Low-Voltage Distribution Networks”) and where this is (are) their only Generation Set(s), and which has been installed, commissioned and operated in accordance with Annex 1, Item 13, that User shall not be required to comply with the requirements of DPC7 in respect of that (those) Generation Set.

DPC7.1.4 Where Generating Plant is not intended for parallel operation, but where short term paralleling is desirable to avoid loss of supply during changeover, then the Generating Plant may be permitted to operate in parallel with the DNO’s Distribution System for no more than 5 minutes in any month, and no more frequently than once per week. If the duration of parallel connection exceeds this period, or this frequency, then the Generating Plant must be considered as if it is, or can be, operated in long term parallel operation mode. An alternative frequency and duration may be agreed between the DNO and the Generator, taking account of particular site circumstances and Generating Plant design.

DPC7.1.5 Where DPC 7.1.4 applies, an electrical time interlock should be installed to ensure that the period of parallel operation does not exceed the agreed period. The timer should be a separate device from the changeover control system such that failure of the auto changeover system will not prevent the parallel being broken.

DPC7.2 General Requirements

DPC7.2.1 Embedded Generators connected to the DNO’s Distribution System will comply with the requirements of Item 3, DGD Annex 1 Engineering Recommendation G59/3, “Recommendation for the connection of generating plant to the distribution systems of licensed distribution network operators”.

DPC7.2.2 Every installation or network which includes Generating Plant operating in parallel with the DNO’s Distribution System must include an Isolating Device capable of disconnecting the whole of the Generating Plant infeed from the DNO’s Distribution System. This Isolating Device will normally be owned by the Generator, but may by agreement be owned by the DNO.
DPC7.2.3 The Generator must grant the DNO rights of access to the Isolating Device without undue delay and the DNO must have the right to isolate the Generator’s infeed at any time should such disconnection become necessary for safety reasons and in order to comply with statutory obligations. The Isolating Device should normally be installed at the Connection Point, but may be positioned elsewhere with the DNO’s agreement.

DPC7.2.4 To ensure that DNO staff and that of the User and the User’s contractors are aware of the presence of Generating Plant, appropriate warning labels should be used. Where the installation is connected to the DNO’s Distribution System at Low Voltage the installer should generally provide labelling at the Connection Point, meter position, consumer’s unit and at all points of isolation within the User’s premises to indicate the presence of Generating Plant. The labelling should be sufficiently robust and if necessary fixed in place to ensure that it remains legible and secure for the lifetime of the installation. The Health and Safety (Safety Signs & Signals) Regulations 1996 stipulates that labels should display the prescribed triangular shape, and size, using black on yellow colouring.

DPC7.2.5 The disconnection of Generating Plant must be achieved by the physical separation of mechanical contacts unless the disconnection is at Low Voltage and the equipment for achieving the disconnection contain appropriate self monitoring of the point of disconnection, in which case an appropriate electronic means such as a suitably rated semiconductor switching device would be acceptable.

DPC7.2.6 Where the Connection Point provided by the DNO for parallel operation is at HV, in addition to the provisions of DOC8, the Generator must ensure that a person with authority, or his staff, is available at all times to receive communications from the DNO Control Person so that emergencies, requiring urgent action by the Generator, can be dealt with adequately. Where required by the DNO, it will also be a duty of the Generator’s staff to advise the DNO Control Person of any abnormalities that occur on the Generating Plant which have caused, or might cause, disturbance to the DNO’s Distribution System, for example earth faults.

DPC7.2.7 Manual synchronizing can only be done with the specific agreement of the DNO.

DPC7.2.8 The DNO’s interface circuit breaker will not be used for synchronizing, without the express agreement of the DNO.

DPC7.3 Provision of Information

Embedded Generators can have a significant effect on the DNO’s Distribution System and as a result its Users. To enable the DNO to assess the impact Embedded Generating Plant or an Embedded Transmission System will have on the DNO’s Distribution System, the Embedded Generator will be required to supply information to the DNO.
Embedded Generators shall provide the following minimum information to the DNO during the connection application process or otherwise as requested by the DNO:

Relevant Sections:

(a) Power Station and site data for all Embedded Generators excluding the OTSO.

(b) Generation Set data for all Embedded Generating Plant

(c) Generation Set data for specified types of Embedded Generating Plant
   5c(i) Synchronous generators
   5c(ii) Fixed speed induction generators
   5c(iii) Double fed induction generators
   5c(iv) Converter connected generators
   5c(v) Transformers

(d) Generation Set data for Embedded Medium Power Stations

(e) Embedded Transmission System data

When applying for connection to the DNO’s Distribution System Embedded Generators shall also refer to DPC5.

The DNO will use the information provided to model the DNO’s Distribution System and to decide what method of connection will need to be employed and the voltage level to which the connection should be made. If the DNO reasonably concludes that the nature of the proposed connection or changes to an existing connection requires more detailed consideration then further information may be requested. It is unlikely that more information than that specified in DPC7.3.1 will be required for Embedded Generators who are to be connected at Low Voltage and have less than 50kVA in capacity, or connected at other than Low Voltage and have less than 300kVA in capacity.

DPC7.3.1 Information Required from all Embedded Generators

It will be necessary for each Embedded Generator to provide to the DNO information on physical and electrical characteristics of the Power Station and site as a whole as set out in Schedules 5a or 5e of the Distribution Data Registration Code before entering into an agreement to connect any Generating Plant or an Embedded Transmission System onto the DNO’s Distribution System:-
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

The information required includes:

(a) Details of the proposed connection point (geographical and electrical) and connection voltage.

(b) The number and types of generators and the total capacity of the power station and auxiliary supplies under various operating conditions.

(c) Sketches of System Layout:
   Operation Diagrams showing the electrical circuitry of the existing and proposed main features within the User’s System and showing as appropriate busbar arrangements, phasing arrangements, earthing arrangements, switching facilities and operating voltages.

(d) Interface Arrangements
   (i) The means of synchronisation between the DNO and User;
   (ii) Details of arrangements for connecting with earth that part of the Embedded Generator’s System directly connected to the DNO’s Distribution System.
   (iii) The means of connection and disconnection which are to be employed.
   (iv) Precautions to be taken to ensure the continuance of safe conditions should any earthed neutral point of the Embedded Generator’s System operated at HV become disconnected from earth.

More or less detailed information than that contained above might need to be provided, subject to the type and size of generation or the point at which connection is to be made to the DNO’s Distribution System. This information will need to be provided by the Embedded Generator at the reasonable request of the DNO.

DPC7.3.2 Additional Generation Set and Plant and Equipment Data Required from Embedded Generators.

The Standard Planning Data and Detailed Planning Data specified in Schedule 5b and Schedule 5c (or Schedule 5e for the OTSO) of the Distribution Data Registration Code may be requested by the DNO from the User before entering into an agreement to connect any Generating Plant or Embedded Transmission System onto the DNO’s Distribution System.

The information specified in Schedule 5b of the Distribution Data Registration Code includes generic data for all Embedded Generation Sets.

The information specified in Schedule 5c of the Distribution Data Registration Code includes the more detailed electrical parameters of individual Generation Sets and associated plant such as transformers, power factor correction equipment. The information required is classified as Standard Planning Data and Detailed Planning Data for each of the following categories of Embedded Generation Set:

(i) Synchronous generators
(ii) Fixed speed induction generators
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

(iii) Doubly fed induction generators
(iv) Series converter connected generators.
(v) Transformers

Under certain circumstances either more or less detailed information than that specified above might need to be provided and will be made available by the Embedded Generator at the request of the DNO.

DPC 7.3.3 Extra Information From Embedded Generators to be Provided to Meet Grid Code Requirements

DPC 7.3.3(a) The DNO has an obligation under PC3.3 of the Grid Code to submit certain planning data relating to Embedded Medium Power Stations to NGC. The relevant data requirements of the Grid Code are also listed in PC3.3 of the Grid Code. It is incumbent on Embedded Medium Power Stations to provide this data listed in PC3.3 of the Grid Code to the DNO.

Where a Generator in respect of an Embedded Power Station is a party to the CUSC this DPC 7.3.3 will not apply.

DPC 7.3.3(b) In addition to supplying the DNO with details of Embedded Generating Plant there is a requirement to provide information to NGC where it has been specifically requested by NGC in the circumstances provided for under the Grid Code.

DPC 7.3.4 Information Provided by the DNO to Users

In accordance with Condition 4 and Condition 25 of its Distribution Licence the DNO is required to provide certain information to Users so that they have the opportunity to identify and evaluate opportunities to connect to the DNO’s Distribution System as set out in DPC4.5. Comprehensive information on the DNO’s Distribution System operating at 33kV and above is made available to Users through the Long Term Development Statements provided under Condition 25 of the Distribution Licence. Schedule 5d of the Distribution Data Registration Code is indicative of the type of network data the DNOs is required to provide to Users for identifying opportunities for connection of generation at voltages below 33kV. On the production of Schedule 5d data for a User, the DNO will update any relevant data that would otherwise be provided from the Long Term Development Statement.

DPC 7.4 Technical Requirements

DPC 7.4.1 Generating Plant Performance Requirements

DPC 7.4.1.1 The requirements of this DPC7.4.1 do not apply to Generation Sets that are designed and installed for infrequent short term parallel operation only.

DPC 7.4.1.2 For Embedded Generating Plant, which does not constitute or contain BM Units that are active (ie submitting bid-offer data) in the Balancing Mechanism, the electrical parameters required to be achieved at the Generation Set terminals are defined according to the connection method and will be specified by the DNO with the offer for connection. A Generation Set or Power Station must be capable of supplying its Registered Capacity within the System Frequency range 49.5 to 50.5 Hz. The output power should not be affected by voltage changes in the permitted operating range.
DPC7.4.1.3 In exceptional circumstances, the Frequency of the DNO’s Distribution System could rise above 50.5 Hz or fall below 49.5 Hz. Generation Sets in Embedded Small Power Stations shall be capable of continuing to operate in parallel with the DNO’s Distribution System in accordance with the following:

a. 47 Hz – 47.5 Hz Operation for a period of at least 20 seconds is required each time the Frequency is within this range

b. 47.5 Hz – 51.5 Hz Disconnection by overfrequency or underfrequency Protection is not permitted in this range

c. 51.5 Hz – 52 Hz Operation for a period of at least 90 seconds is required each time the Frequency is within this range

DPC7.4.1.4 These Frequency operating range requirements also apply to Generation Sets in Embedded Small Power Stations already connected on or before 1 August 2010, unless the Registered Capacity of the Embedded Small Power Station is below 5 MW.

DPC7.4.1.5 For the avoidance of doubt, the above requirements do not preclude disconnection of Generation Sets by Protection agreed with the DNO or when necessary to protect Plant or Apparatus from being damaged

DPC7.4.1.6 Embedded Medium Power Stations additionally have to comply with DPC 7.5.

DPC7.4.2 Control Arrangements

The DNO will specify in writing if a continuously acting fast response automatic excitation control system is required to control the Generation Set voltage without instability over the entire operating range of the Generation Set or Power Station. This will be dependent on the size and type of Generating Plant or Power Station and the adjacent part of the DNO’s Distribution System to which it is connected.

DPC7.4.3 Protection Requirements

DPC7.4.3.1 Co-ordinating with Existing Protection

It will be necessary for the Protection associated with Embedded Generating Plant and any Embedded Transmission System to co-ordinate with the Protection associated with the DNO’s Distribution System as follows:-

(a) For Generating Plant and any Embedded Transmission System directly connected to the DNO’s Distribution System the Embedded Generator must meet the target clearance times for fault current interchange with the DNO’s Distribution System in order to reduce to a minimum the impact on the DNO’s Distribution System of faults on circuits owned by Embedded Generators or on an Embedded Transmission System. The DNO will ensure that the DNO Protection settings meet its own target clearance times.

The target clearance times are measured from fault current inception to arc extinction and will be specified by the DNO to meet the requirements of the relevant part of the Distribution System.
(b) The settings of any Protection controlling a circuit breaker or the operating values of any automatic switching device at any point of connection with the DNO’s Distribution System, as well as the User’s maintenance and testing regime, shall be agreed between the DNO and the User in writing during the connection consultation process.

The Protection settings or operating values shall not be changed without the express agreement of the DNO.

(c) It will be necessary for the Generating Plant Protection and Embedded Transmission System Protection to co-ordinate with any auto-reclose policy specified by the DNO. In particular the Generating Plant Protection should detect a loss of mains situation and disconnect the Generating Plant in a time shorter than any auto reclose dead time. This should include an allowance for circuit breaker operation and generally a minimum of 0.5s should be allowed for this. For pole mounted auto-reclosers often set with a dead time of 1s, this implies a loss of mains response time of 0.5s. Similar response time is expected from under and over voltage relays.

DPC7.4.3.2 Specific Protection Required for Embedded Generating Plant

In addition to any Protection installed by the Generator to meet his own requirements and statutory obligations on him, the Generator must install Protection to achieve the following objectives:

i. For all Generating Plant:
   a. To disconnect the Generating Plant from the System when a System abnormality occurs that results in an unacceptable deviation of the Frequency or voltage at the Connection Point;
   b. To ensure the automatic disconnection of the Generating Plant, or where there is constant supervision of an installation, the operation of an alarm with an audio and visual indication, in the event of any failure of supplies to the protective equipment that would inhibit its correct operation.

ii. For polyphase Generating Plant
   a. To inhibit connexion of Generating Plant to the System unless all phases of the DNO’s Distribution System are present and within the agreed ranges of Protection settings;
   b. To disconnect the Generating Plant from the System in the event of the loss of one or more phases of the DNO’s Distribution System;

iii. For single phase Generating Plant
   a. To inhibit connexion of Generating Plant to the System unless that phase of the DNO’s Distribution System is present and within the agreed ranges of Protection settings;
   b. To disconnect the Generating Plant from the System in the event of the loss of that phase of the DNO’s Distribution System;

DPC7.4.3.3 Suitable Protection arrangements and settings will depend upon the particular Generator’s installation and the requirements of the DNO’s Distribution
System. These individual requirements must be ascertained in discussions with the DNO. To achieve the objectives above, the Protection must include the detection of:

a. Over Voltage (O/V)
b. Under Voltage (U/V)
c. Over Frequency (O/F)
d. Under Frequency (U/F)
e. Loss of Mains (LoM)

There are different Protection settings dependent upon the System voltage at which the Generating Plant is connected (LV or HV) and also its size (eg Small Power Station, Medium Power Station and Large Power Station).

Protection settings for a Large Power Station and any connexion at 132kV must be considered on an individual basis and be consistent with Grid Code requirements. Loss of Mains protection will only be permitted at these sites if sanctioned by NGC – see DPC7.4.3.8 below.
The following summarizes the required Protection settings that will generally be applied:

<table>
<thead>
<tr>
<th>Prot Function</th>
<th>Small Power Station</th>
<th>Medium Power Station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LV Protection§</td>
<td>HV Protection§</td>
</tr>
<tr>
<td></td>
<td>Setting, Time</td>
<td>Setting, Time</td>
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<tr>
<td>U/V st 1</td>
<td>$V_{φ-n}$ - 13% = 200.1V</td>
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</tr>
<tr>
<td>U/V st 2</td>
<td>$V_{φ-n}$ - 20% = 184.0V</td>
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<td>K1 x 6 degrees #</td>
</tr>
<tr>
<td>LoM(RoCoF) §</td>
<td>K2 x 0.125 Hz/s</td>
<td>K2 x 0.125 Hz/s</td>
</tr>
</tbody>
</table>

Notes:
- $φ-n; φ-φ$ denote RMS phase to neutral and phase-phase values respectively of the voltage at the Connection Point
- § HV and LV Protection settings are to be applied according to the voltage reference at which the protection is measuring, i.e:
  - If the G59 protection takes its voltage reference from an LV source then LV protection settings shall be applied.
  - If the G59 protection takes its voltage reference from an HV source then HV protection settings shall be applied.
- †A value of 230V shall be used for all DNO LV systems
- ‡A value to suit the voltage of the connexion point
- * Might need to be reduced if auto-reclose times are <3s
- # Intertripping may be considered as an alternative to the use of a Loss of Mains relay
- K1 = 1.0 (for low impedance networks) or 1.66 – 2.0 (for high impedance networks)
- K2 = 1.0 (for low impedance networks) or 1.6 (for high impedance networks)
- § Rate of change of frequency

Over and Under voltage Protection must operate independently for all phases in all cases.
DPC7.4.3.6 The settings in DPC7.4.3.4 apply to Embedded Small Power Stations and Embedded Medium Power Stations. In exceptional circumstances Generators have the option to agree alternative settings with the DNO if there are valid justifications in that the Generating Plant may become unstable or suffer damage with the settings specified in DPC7.4.3.4. The agreed settings should be recorded in the Connection Agreement.

DPC7.4.3.7 The underfrequency and overfrequency Protection settings set out in DPC7.4.3.4 also apply to Generation Sets in Embedded Small Power Stations already existing on or before 1 August 2010 with a Registered Capacity at or above 5 MW, except where single stage Frequency Protection relays are used, in which case the following settings apply.

<table>
<thead>
<tr>
<th>Protection Function</th>
<th>Setting</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>U/F</td>
<td>47.5Hz</td>
<td>0.5s</td>
</tr>
<tr>
<td>O/F</td>
<td>51.5Hz</td>
<td>0.5s</td>
</tr>
</tbody>
</table>

In exceptional circumstances Generators have the option to agree alternative settings with the DNO if there are valid justifications in that the Generating Plant may become unstable or suffer damage with the settings specified above. The agreed settings should be recorded in the Connection Agreement.

DPC7.4.3.8 A loss of mains Protection of RoCoF or vector shift type will generally be appropriate for Small Power Stations, but this type of loss of mains Protection must not be installed for Power Stations >50MW. In those cases where the DNO requires loss of mains Protection this must be provided by a means not susceptible to spurious or nuisance tripping, eg intertripping.

DPC7.4.3.9 Where short term paralleling in accordance with DPC7.1.4 is employed, the protection settings in the following table should be used in preference to those in DPC7.4.3.4.

<table>
<thead>
<tr>
<th>Prot Function</th>
<th>Infrequent Short Term Parallel Operation</th>
<th>LV Protection</th>
<th>HV Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Setting</td>
<td>Time</td>
<td>Setting</td>
</tr>
<tr>
<td>U/V</td>
<td>$V_{\varphi-n}^{\dagger} - 10%$ (207V)</td>
<td>0.5s</td>
<td>$V_{\varphi-\varphi}^{\dagger} - 6%$</td>
</tr>
<tr>
<td>O/V</td>
<td>$V_{\varphi-n}^{\dagger} + 14%$ 262.2V</td>
<td>0.5s</td>
<td>$V_{\varphi-\varphi}^{\dagger} + 6%$</td>
</tr>
<tr>
<td>U/F</td>
<td>49.5Hz</td>
<td>0.5s</td>
<td>49.5Hz</td>
</tr>
<tr>
<td>O/F</td>
<td>50.5Hz</td>
<td>0.5s</td>
<td>50.5Hz</td>
</tr>
</tbody>
</table>

† A value of 230V shall be used in all cases for DNO LV systems
‡ A value to suit the voltage of the HV connexion point
DPC7.4.4 Fault Ride Through and Phase Voltage Unbalance

Any Generation Set or Power Station connected to the DNO’s Distribution System, where it has been agreed between the DNO and the Generator that the Generator’s Power Station will contribute to the DNO’s Distribution System security, may be required to withstand, without tripping, the effects of a close up three phase fault and the Phase (Voltage) Unbalance imposed during the clearance of a close-up phase-to-phase fault, in both cases cleared by the DNO’s main protection. The DNO will advise the Embedded Generator in each case of the likely tripping time of the DNO’s protection, and for phase-phase faults, the likely value of Phase (Voltage) Unbalance during the fault clearance time.

In the case of phase to phase faults on the DNO’s system that are cleared by System back-up Protection which will be within the Plant short time rating on the DNO’s Distribution System the DNO, on request during the Connection Agreement process, will advise the Embedded Generator of the expected Phase Voltage Unbalance.

DPC7.4.5 System Stability

DPC7.4.5.1 The following requirements for system design within this DPC 7.4.5 will generally be applied by the DNO to Power Stations connected at 33kV and above. However there will be cases where the specific network conditions, including existing connected Power Stations, requires the DNO to apply these considerations at lower voltages.

DPC7.4.5.2 With the System in its normal operating state, it is desirable that all Generation Sets remain connected and stable for any of the following credible fault outages,

(a) any one single circuit overhead line, transformer feeder or cable circuit, independent of length,

(b) any one transformer or reactor,

(c) any single section of busbar at or nearest the point of connection where busbar protection with a total clearance time of less than 200ms is installed,

(d) if demand is to be secured under a second circuit outage as required by ER P2/6, fault outages (a) or (b), overlapping with any pre-existing first circuit outage, usually for maintenance purposes. In this case the combination of circuit outages considered should be that causing the most onerous conditions for System Stability, taking account of the slowest combination of main protection, circuit breaker operating times and strength of the connections to the system remaining after the faulty circuit or circuits have been disconnected

DPC7.4.5.3 Any Generation Set that causes the System to become unstable under fault conditions must be rapidly disconnected to reduce the risk of Plant damage and disturbance to the System.

DPC7.4.6 Neutral Earthing

The winding configuration and method of earthing connection shall be agreed with the DNO.

In addition, where the Generator’s Connection Point is at Low Voltage the following shall apply
(a) Where an earthing terminal is provided by the DNO it may be used by a Generator for earthing the Generating Plant, provided the DNO earth connection is of adequate capacity. If the Generating Plant is intended to operate independently of the DNO’s supply, the Generating Plant must include an earthing system which does not rely upon the DNO’s earthing terminal. Where use of the DNO’s earthing terminal is retained, it must be connected to the Generating Plant earthing system by means of a conductor at least equivalent in size to that required to connect the DNO’s earthing terminal to the installation.

(b) Where the Generating Plant may be operated as a switched alternative only to the DNO’s System, the Generator shall provide an independent earth electrode.

(c) Where it is intended to operate in parallel with the DNO’s Low Voltage System with the star point connected to the neutral and/or earthing system, precautions will need to be taken to limit the effects of circulating harmonic currents. It is permissible to insert an impedance in the supply neutral of the Generating Plant for this purpose, for those periods when it is paralleled with the DNO’s System. However, if the Generating Plant is operating in isolation from the DNO’s Distribution System it will be necessary to have the Generating Plant directly earthed.

(d) Where the Generating Plant is designed to operate independently from the DNO’s Distribution System the switchgear that is used to separate the two Systems shall break all four poles (3 phases and neutral). This prevents any phase or neutral current, produced by the Generating Plant, from flowing into the DNO’s Distribution System when it operates as a switched alternative only supply

DPC7.4.7 Frequency Sensitive Relays

It is conceivable that a part of the DNO’s Distribution System, to which Embedded Generators are connected can, during emergency conditions, become detached from the rest of the System. It will be necessary for the DNO to decide, dependent on local network conditions, if it is desirable for the Embedded Generators to continue to generate onto the islanded DNO’s Distribution System.

If no facilities exist for the subsequent resynchronisation with the rest of the DNO’s Distribution System then the Embedded Generator will under DNO instruction, ensure that the Generating Plant and/or Embedded Transmission System is disconnected for re-synchronisation.

DPC7.4.8 Black Start Capability

The National Electricity Transmission System will be equipped with Black Start Stations (in accordance with the Distribution Operating Code DOC 9). It will be necessary for each Embedded Generator to notify the DNO if its Generating Plant has a restart capability without connection to an external power supply, unless the Embedded Generator shall have previously notified NGC accordingly under the Grid Code. Such generation may be registered by NGC as a Black Start Station.
DPC7.4.9 Commissioning Tests

DPC7.4.9.1 Where Generating Plant or an Embedded Transmission System requires connection to the DNO’s Distribution System in advance of the commissioning date, for the purposes of testing, the Embedded Generator must comply with the requirements of the Connection Agreement. The Embedded Generator shall provide the DNO with a commissioning programme, approved by the DNO if reasonable in the circumstances, to allow commissioning tests to be co-ordinated.

DPC7.4.9.2 The Generator will demonstrate all the commissioning tests performed on his Generating Plant in order to discharge the requirements of the Distribution Code and Annex 1, item 3 (ER G59/3). In general the DNO will witness these tests for Generating Plant connected to the DNO’s Distribution System at HV. For Generating Plant connected to the DNO's Distribution System at Low Voltage it is expected that the DNO will not witness the commissioning tests in the majority of cases.

DPC7.5 Technical Requirements for Medium Power Stations

DPC7.5.1 Where a Generator in respect of an Embedded Power Station is a party to the CUSC this DPC 7.5 will not apply.

DPC7.5.2 In addition to the requirements in DPC7.4, the DNO has an obligation under CC 3.3 of the Grid Code to ensure that all relevant Grid Code Connection Condition requirements are met by Medium Power Stations. These requirements are summarised in CC 3.4 of the Grid Code. It is incumbent on Medium Power Stations to comply with the relevant Grid Code requirements listed in CC3.4 of the Grid Code as part of compliance with this Distribution Code. Note that a DC Converter installation of capacity greater than 50MW and less than 100MW is considered to be a Medium Power Station for the purposes of Grid Code compliance in this Distribution Code.

DPC7.5.3 Where data is required by NGC from Medium Power Stations, nothing in the Grid Code or Distribution Code precludes the Generator from providing the information directly to NGC in accordance with Grid Code requirements. However, a copy of the information should always be provided in parallel to the DNO.

DPC7.5.4 Grid Code Connection Conditions Compliance

DPC7.5.4.1 The technical designs and parameters of the Embedded Medium Power Stations will comply with the relevant Connection Conditions of the Grid Code. A statement to this effect, stating compliance with OC5.8 of the Grid Code is required to be presented to the DNO, for onward transmission to NGC, before commissioning of the Power Station. Note that the statement might need to be resubmitted post commissioning when assumed values etc have been confirmed.

DPC7.5.4.2 Should the Generator make any material change to such designs or parameters as will have any effect on the statement of compliance referred to in DPC7.5.4.1, the Generator must notify the change to the DNO, as soon as reasonably practicable, who will in turn notify NGC.

DPC7.5.4.3 Tests to ensure Grid Code compliance may be specified by NGC in accordance with the Grid Code. It is the Generator’s responsibility to carry out these tests.
DPC 7.5.4.4 Where NGC can reasonably demonstrate that for Total System stability issues the Medium Power Station should be fitted with a power system stabiliser, NGC will notify the DNO who will then require it to be fitted for compliance with this DPC 7.5.4.4.
KEY:-
(A) Practical Stability Limit
(B) Rotor Heating Limit
(C) Transformer Tap Limit
(D) MVA Limit

GENERATOR
MW ......................
MVA ......................
pf ......................
kV ...................... (term)
Xs ......................

TRANSFORMER
MVA ......................
Xs ......................

UNIT TRANSFORMER
MW Load ......................
MVAr Load ......................

SYSTEM VOLTAGE
kV ...................... (nominal)
(P.U. Values)

Comments:- Operating chart confirmed by users.
DISTRIBUTION PLANNING AND CONNECTION CODE (DPC)

DISTRIBUTION PLANNING AND CONNECTION CODE 8

DPC8 TRANSFER OF PLANNING DATA

DPC8.1 Introduction

DPC8.1.1 Distribution Planning and Connection Code DPC8 details information to be exchanged between the DNO and Users that are connected at High Voltage including Embedded Generators and Other Authorised Distributors.

It includes data that is necessary in order for the DNO’s Distribution System to be developed in an efficient, co-ordinated and economic manner, and to enable the DNO to comply with the conditions contained in its Distribution Licence.

DPC8.2 Planning Information to be Provided by Users

DPC8.2.1 Prospective and existing Users of the DNO’s Distribution System must provide sufficient planning data/information as can reasonably be made available, when requested by the DNO from time to time to enable the DNO to comply with the requirements under its Distribution Licence. For those Users from whom Demand forecasts are required under DOC1, there will be a requirement to prepare an annual submission to the DNO. This submission, which is to be in accordance with DOC1, should include a development plan covering at least the subsequent 3 years and, where the User holds planning data or information relating to subsequent years up to 7 years ahead that data or information, including changes either increasing or decreasing in Demand, transfer requirements or generating capacity as appropriate.

DPC8.2.2 In addition to periodic updates of planning information a User should give adequate notice of any significant changes to the User’s System or operating regime to enable the DNO to prepare its development plan, budget for, and implement any necessary System modifications. Such information should include any changes either increasing or decreasing in Demand, transfer requirements or generating capacity as appropriate. In the event of unplanned changes in a User’s System or operating regime a User shall notify the DNO as soon as is practically possible to ensure any contingency measures, as necessary, can be implemented by the DNO.

DPC8.2.3 The DNO has an obligation under the CUSC to submit certain planning data/information relating to Existing Offshore Generators to NGC. Any Existing Offshore Generators will be required to cooperate with the DNO to contribute to the full and timely completion of the Offshore Transmission Implementation Plan.

DPC8.3 Information to be Provided to Users

DPC8.3.1 Where the DNO has received from a User any information or data under DPC8.3 or where the DNO proposes to make modifications to the DNO’s Distribution System which, in either case, in the reasonable opinion of the DNO, may have an impact upon the System of any other User, the DNO will notify that User of the proposals subject to any constraints relating to the timing of release of information or confidentiality provisions.
DPC8.4 Reactive Compensation Plant

DPC8.4.1 A User shall provide the DNO with information on any reactive compensation Plant directly or indirectly connected to a DNO’s Distribution System, other than at Low Voltage, including:-

(a) The MVAr capacitive or inductive rating of the Equipment and operating range if variable;

(b) Details of any automatic control logic such that the operating characteristics can be determined; and

(c) The point of connection to the DNO’s Distribution System.

DPC8.5 Lumped Network Susceptance

DPC8.5.1 Under certain circumstances it will be necessary for the User to provide, at the request of the DNO, details of the equivalent lumped network susceptance at Normal Frequency of the User’s System at nominal Frequency referred back to the connection with the DNO’s Distribution System. This should include any shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable (ie. they are regarded as part of the cable).

DPC8.5.2 It should not include:-

(a) Independently switched reactive compensation plant connected to the User’s System (covered in DPC8.4.1)

(b) Any susceptance of the User’s System inherent in the Reactive Power Demand.

DPC8.6 Short Circuit Infeed to the DNO’s Distribution System

DPC8.6.1 Information shall be exchanged between the DNO and the User on fault infeed levels at the point of connection with the DNO’s Distribution System in the form of:-

(a) The maximum and minimum 3-phase symmetrical and phase earth short circuit infeed.

(b) The X/R ratio under short circuit conditions.

(c) In the case of interconnected Systems, adequate equivalent network information.

DPC8.7 Interconnection Impedance

DPC8.7.1 For User interconnections that operate in parallel with the DNO’s Distribution System details of the interconnection impedance shall be exchanged between the DNO and the User. This information shall include an equivalent single impedance (resistance, reactance and shunt susceptance) of the parallel User or DNO’s Distribution System.
DPC8.8  **Demand Transfer Capability**

DPC8.8.1 Information shall be exchanged on Demand transfer capability where the same Demand may be supplied from alternative DNO or User points of supply. This shall include the proportion of Demand normally fed from each point of supply and the arrangements (manual or automatic) for transfer under planned/fault outage conditions.

DPC8.9  **Other Authorised Distributor’s Distribution System Data**

DPC8.9.1 Other Authorised Distributors shall provide the DNO with detailed data relating to the interface between their Distribution System and that of the DNO, covering circuit parameters, switchgear and Protection arrangements of equipment directly connected to or affecting the Distribution System to enable the DNO to assess any implications associated with these points of connection. Reciprocal arrangements will apply between the DNO and its Users.

DPC8.10  **Transient Overvoltage Effects**

DPC8.10.1 For User’s busbars connected to the DNO’s Distribution System sufficient details may need to be exchanged with respect to the User/DNO Ownership Boundary to enable an assessment, where necessary, of transient overvoltage effects to be made. This information may relate to physical and electrical layouts, parameters, specifications and Protection details.

DPC8.11  **More Detailed Information**

In certain circumstances more detailed information may be needed and will be provided upon the reasonable request of the DNO.
DISTRIBUTION OPERATING CODE (DOC)
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 1

DOC1 DEMAND FORECASTS

DOC1.1 Introduction

DOC1.1.1 In order for the DNO to operate the DNO’s Distribution System efficiently and to ensure maximum System security and System Stability, there is a need for those Users specified in DOC1.3 to provide loading and generation output information to the DNO.

DOC1.1.2 The Grid Code specifies NGC’s requirements for Demand forecasting for Generation Sets which constitute or contain BM Units which are active (ie. submitting bid-offer data) in the Balancing Mechanism. This Distribution Operating Code DOC1 specifies the information to be provided by other Generation Sets and all Users of the DNO’s Distribution System specified in DOC1.3 below.

DOC1.1.3 This Demand forecasting information is required to enable the DNO to maintain the integrity of the DNO’s Distribution System. The Licensee under its Distribution Licence has an obligation under the Grid Code to provide Demand forecast information to NGC in order that generation output can be matched with Demand. The information, required to be provided by Users (specified in DOC1.3 below) under this Distribution Operating Code, will enable the Licensee to comply with these requirements of the Grid Code.

DOC1.1.4 Where Demand data is required from the User, this means the MW Demand of electricity at the DNO point of supply to the User. The DNO may, in certain cases, specify that the Demand data shall include the MVAr Demand.

DOC1.1.5 The information to be provided to the DNO shall be in writing as specified in DGD2 (vi).

DOC1.1.6 In this Distribution Operating Code Year 0 means the current calendar year at anytime, Year 1 means the next calendar year at anytime, Year 2 means the calendar year after Year 1, etc

DOC1.1.7 References in this Distribution Operating Code to data to be supplied on a half-hourly basis refers to it being supplied for each period of 30 minutes ending on the hour and half-hour in each day.

DOC1.2 Objectives

The objectives of this Distribution Operating Code DOC1 are to:-

(a) Set out the Demand forecast and Embedded Generating Plant Output or Embedded Transmission System output information required to be provided by Users to enable the DNO to operate the DNO’s Distribution System.

(b) Specify the information required to be provided by Users to the DNO to enable it to comply with its obligations under the Grid Code.
DISTRIBUTION OPERATING CODE (DOC)

DOC1.3 Scope

This Distribution Operating Code applies to the following Users of the DNO’s Distribution Systems which are connected at HV:-

(a) Customers with a Demand greater than 5 MW.
(b) Embedded Generators whose output is greater than 1MW where the DNO reasonably considers it appropriate.
(c) Other Authorised Distributors connected to the DNO’s Distribution System.
(d) Suppliers, at the request of the DNO, on behalf of their Customers.

DOC1.4 Information Flow and Co-ordination

DOC1.4.1 Demand Forecast Information

The DNO will co-ordinate all Demand forecast information for each Grid Supply Point to meet the requirements of the Grid Code. The DNO will aggregate forecast information provided by Users, where appropriate, and provide forecast information to NGC where the Demand, or change in Demand, is equal to or greater than the Demand Control Notification Level at any DNO Connection Point.

DOC1.4.2 Generation Output Information

Information relating to Generating Plant Embedded in the DNO’s Distribution System or in the network of an Other Authorised Distributor or any Embedded Transmission System shall, where specified be provided to the DNO in writing. A Customer With Own Generation may be required to furnish such information should the DNO reasonably consider that it would affect its Demand forecasts.

DOC1.4.3 Information to be Provided by the DNO

Where reference is made to “as specified by the DNO” or “the National Electricity Transmission System days or times of Peak Demand or minimum Demand”, the DNO will provide each User, from whom Demand forecasts are required, with such information.

DOC1.5 Demand Forecast Data

DOC1.5.1 Planning Periods

Information shall be supplied by Users to the DNO for the following rolling timescales is required by the DNO:-

(a) Operational Planning Phase – next three years ahead
(b) Programming Phase – 24 hours to 8 weeks ahead
(c) Control Phase – 0 to 24 hours ahead

The information supplied will be as specified below and as set out in the Schedules of the Distribution Data Registration Code.
DISTRIBUTION OPERATING CODE (DOC)

DOC1.5.2 Operational Planning Phase (next 3 years ahead).

DOC1.5.2.1 The information required to be provided to the DNO during the Operational Planning Phase is specified in Appendix 1 of this Distribution Operating Code, DOC1.

DOC1.5.2.2 The information shall be provided to the DNO by Calendar week 35 each year.

DOC1.5.3 Programming Phase (24 hours to 8 weeks ahead inclusive).

DOC1.5.3.1 The information required to be provided by the User to the DNO during the Programming Phase is specified in Appendix 2 of this Distribution Operating Code, DOC1.

DOC1.5.3.2 For the period 2 to 8 weeks ahead the information shall be supplied to the DNO by 1600 hours each Friday.

DOC1.5.3.3 For the period 2 to 13 days ahead the information shall be updated and supplied to the DNO by 0900 hours each Wednesday.

DOC1.5.3.4 The DNO may require the information specified in Appendices 1 and 2 of this Distribution Operating Code to be updated if it reasonably considers it necessary and to be supplied to the DNO by 0800 hours each day (or such other time as specified by the DNO from time to time) for the next day (except that it may be for the next 3 days on Fridays and 2 days on Saturdays) and may be longer (as specified by the DNO at least one week in advance) to cover holiday periods.

DOC1.5.4 Control Phase (0 to 24 hours ahead)

The following information shall be supplied to the DNO at reasonable times to be specified by the DNO for the unexpired period covered by the Control Phase:

(a) Details of any differences of greater than 5MW from the schedules of operation of any Embedded Generating Plant or Embedded Transmission System on a half hourly basis which were supplied under DOC1.5.3.3;

(b) Details from Suppliers of any differences of the amount and duration of their proposed use of Customer Demand Control aggregated to 5MW or more (averaged over any half-hour period) on a half-hourly basis which were supplied under DOC1.5.3.4.

(c) Details from each User connected to the Distribution System of any change in aggregated Demand at the point of supply of greater than 5MW of the Demand.

DOC1.5.5 Post Control Phase

The following shall be supplied to the DNO by 0300 hours each day:

(a) Details of half-hour Active Power and Reactive Power output sent out to the DNO’s Distribution System by Embedded Generating Plant or any Embedded Transmission System where the DNO reasonably considers it appropriate during the previous day on a half-hourly basis.
DISTRIBUTION OPERATING CODE (DOC)

(b) Suppliers, and Other Authorised Distributor connected to the DNO’s Distribution System will provide details of the amount and duration of Demand Control at the DNO Connection Point aggregated to 5MW or more (averaged over any half-hour) which was implemented during the previous Operational Day.

DOC1.6 Forecast Factors

DOC1.6.1 The following factors will be taken into account by the DNO and Users when conducting Demand forecasts in the Operational Planning Phase:-

(a) Historic Demand data and trends.
(b) Weather forecasts (responsibility for weather correction of User’s Demand rests with the User.)
(c) Incidence of major events or activities
(d) Embedded Generation Set or Embedded Transmission System Schedules.
(e) Demand transfers.
(f) Interconnection with adjacent Other Authorised Distributors.
(g) Demand Control proposed to be operated by Suppliers.
(h) Any other factor reasonably considered necessary.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 1

DOC 1 - APPENDIX 1

Demand Forecasts Operational Planning Phase (3 years ahead)

EACH CALENDAR YEAR BY WEEK 35:

For each of the next 3 years forecast information for:

(a) Half-hour Active Power and Power Factor (or Reactive Power) at Annual ACS Conditions for the specified time of the annual peak half-hour at the associated Grid Supply Points and at the specified time of the National Electricity Transmission System Peak Demand.

(b) Half-hour Active Power and Power Factor (or Reactive Power) at Average Conditions at the specified half-hour of the National Electricity Transmission System minimum Demand.

(c) Half-hour Active Power output of Embedded Generating Plant or any Embedded Transmission System at the specified half-hour of the National Electricity Transmission System Demand.

In addition, where the loading or the generation output of a User may have a particular impact on the security or stability of the System then the DNO may on request require the following information from a User.

(a) Weekly ACS Conditions and Average Conditions Active and Reactive Power Demand at the time of the specified National Electricity Transmission System Peak Demand each week together with forecasts of Demand to be met and relieved by Embedded Generating Plant Output and planned Demand Control by other Users.

(b) Weekly ACS Conditions Active and Reactive Power Demand at the time of the specified Grid Supply Point Peak Demand each week.

This additional information will, where requested by the DNO, be updated throughout the current year (Year 0) in the Programming Phase, the times to be notified by the DNO where this is necessary.

Where reference is made to “specified” or “National Electricity Transmission System Demand”, the information will be provided by the DNO following the receipt of information provided by NGC in accordance with OC1 of the Grid Code.
DISTRIBUTION OPERATING CODE (DOC)

DOC 1 - APPENDIX 2

Demand forecasts - Programming Phase (24 hours to 8 weeks ahead inclusive)

The following information shall be provided to the DNO in the timescales specified in DOC1.5.3:-

(a) Schedules for the operation of Embedded Generation Set or any Embedded Transmission System whose output is greater than 1MW on a half-hourly basis where the DNO reasonably considers it appropriate

(b) From Suppliers, details of their proposed use of Demand Control measures aggregated to 5MW or more (averaged over any half-hour) on a half-hourly basis for each of the DNO’s Connection Points;

(c) From Customers and Other Authorised Distributors connected to the DNO’s Distribution System whose operations are likely to result in an aggregated change in Demand at the DNO’s Connection Point of supply of greater than 5MW of the Demand at that time on a half-hourly basis.

(d) Any other relevant Demand forecast information reasonably required by the DNO.
DISTRIBUTION OPERATING CODE 2

DOC2 OPERATIONAL PLANNING

DOC2.1 Introduction

DOC2.1.1 Operational Planning within the terms of the Distribution Code comprises the co-ordination through various timescales, of planned outages of Plant and Apparatus which affect the Operation of the DNO’s Distribution System or require the commitment of the DNO’s resources.

DOC2.1.2 This Distribution Operating Code also enables the DNO to meet its Distribution Licence obligation to provide certain information specified in the Grid Code and establishes procedures to enable the collection of such data from Users specified in DOC2.3 below.

DOC2.1.3 Information to be provided to the DNO shall be in writing as specified in DGD2f).

DOC2.1.4 In order for the DNO to fulfil the requirements of this DOC2 it should be noted that the information set out in the Grid Code OC2, to be provided by NGC, will form the basis of Operational Planning under this DOC2.

DOC2.1.5 In this Distribution Operating Code Year 0 means the current calendar year at any time, Year 1 means the next calendar year at any time, Year 2 means the calendar year after Year 1, etc. Where Week 52 is specified read Week 53 in appropriate years.

DOC2.2 Objectives

The objectives of this Distribution Operating Code are:

(a) To set out the DNO’s Operational Planning procedure and a typical timetable for the co-ordination of outage requirements of Plant and Apparatus to be provided by Users to enable the DNO to operate the DNO’s Distribution System.

(b) To specify the information to be provided by Users to the DNO to enable the DNO to comply with its obligations under the Grid Code.

DOC2.3 Scope

This Distribution Operating Code applies to the DNO and the following Users of the DNO’s Distribution System which are connected at HV:-

(a) HV Customers where the DNO considers it appropriate.

(b) Customer With Own Generation where the DNO reasonably considers it appropriate.

(c) Embedded Generating Plant in the DNO’s Distribution System whose Registered Capacity is greater than 1MW and any Embedded Transmission System where the DNO reasonably considers it appropriate.

(d) Any Other Authorised Distributor connected to the DNO’s Distribution System.
DISTRIBUTION OPERATING CODE (DOC)

DOC2.4  Information Flow and Co-ordination

DOC2.4.1 Embedded Generators

Information relating to Embedded Generating Plant where the DNO reasonably considers it appropriate whose Registered Capacity is greater than 5MW, or 1MW in the case of renewable generating plant in Scotland and Embedded Transmission System shall where reasonably required by the DNO be provided by the User directly to the DNO. This may include a Customer With Own Generation where the DNO considers it appropriate.

DOC2.4.2 Other Plant and Apparatus

Information relating to all Plant and Apparatus connected to the DNO’s Distribution System, or that which may affect its Operation, shall be co-ordinated with the DNO.

DOC2.5 Timescales and Data

DOC2.5.1 Detailed implementation of data gathering and timescales will be agreed between the DNO and each User. Due recognition will be given by the DNO to voltage levels and capacities of Plant and Apparatus when assessing information requirements.

DOC2.5.2 All information shall be provided in Decimal Weeks as a minimum, where Week 1 commences in the first week of January as published from time to time.

DOC2.5.3 The rolling timescales involved in Distribution Operating Code DOC2 are illustrated in Figure 1 of this Distribution Operating Code and are as follows:-

(a) **Operational Planning Phase**
    - Long Term Planning Phase - Calendar year 3 ahead.
    - Medium Term - Calendar years 1 and 2 ahead.
    - Short Term - The current calendar year 52 weeks ahead down to 9 weeks ahead.

(b) **Programming Phase**
    - 24 hours to 8 weeks ahead inclusive

(c) **Control Phase**
    - 0 to 24 hours ahead

DOC2.6 Operational Planning

DOC2.6.1 Long Term Programme (Calendar Year 3 ahead - Appendix 1).

DOC2.6.1.1 Each year, the DNO will prepare a Long Term Programme covering year 3 ahead which will include those Distribution System outages, Embedded Transmission System outages and Embedded Generating Plant outages, where the DNO reasonably considers it appropriate, which may affect the performance of the Total System.
DISTRIBUTION OPERATING CODE (DOC)

DOC2.6.1.2 Users and Embedded Generators where the DNO reasonably considers it appropriate will provide the DNO with information in accordance with Appendix 1. This information will be requested by the DNO in order to satisfy the requirements of DOC2.6.1.1.

DOC2.6.2 Medium Term Programme (Calendar years 1 - 2 ahead Appendix 2)

DOC2.6.2.1 The previous Long Term Programme will be updated to form the basis of the Medium Term Programme. The availability of Embedded Generating Plant and any Embedded Transmission System will also be updated.

DOC2.6.2.2 Users and Embedded Generators will provide the DNO with information in accordance with Appendix 2.

DOC2.6.3 Short Term Programme (Current year 52 weeks ahead down to 9 weeks ahead - Appendix 3).

DOC2.6.3.1 The previous Medium Term Programme will be updated to form the basis of the Short Term Programme. The DNO will continually review this programme as necessary and periodically discuss it with the relevant parties as appropriate.

DOC2.6.3.2 It will take account of such review and discussions and any additional outages and the following further details of each outage proposed will be notified at this stage by the appropriate party:-

(a) Return to service times of circuits (if different from programme).
(b) Specific Plant and Apparatus to be worked upon.
(c) Any other information that may be reasonably specified by the DNO from time to time.

DOC2.6.3.3 At any time and from time to time during the current calendar year up to the Programming Phase (8 weeks ahead), Users may notify reasonable changes and additions to the outages previously notified during the Medium Term planning process. The DNO will consider whether the changes will adversely affect System security, stability or other parties, and will discuss with the party in question. Where the change is so discussed the DNO will inform the other affected Users.

DOC2.6.4 Programming Phase (24 hours to 8 weeks ahead inclusive)

DOC2.6.4.1 The Short Term Programme will form the basis of the Programming Phase and a rolling suggested programme for the following week and subsequent 7 week period respectively will be prepared weekly by the DNO.

DOC2.6.4.2 The DNO will update the programme each week and take account of any additional or varied outages.

DOC2.6.4.3 Any decision to depart from the outages and actions determined during this phase will immediately be notified to the DNO, who will inform other affected parties.
DISTRIBUTION OPERATING CODE (DOC)

DOC2.6.5  Generation Scheduling Information (Programming Phase) 24 hours to 8 weeks ahead inclusive.

DOC2.6.5.1 The DNO will obtain Scheduling information from Embedded Generators for Embedded Generating Plant and any Embedded Transmission System which do not constitute or contain BM Units which are active (ie submitting bid-offer data) where it considers it appropriate.

DOC2.6.5.2 The Scheduling information will specify the following on an individual Generation Set or Embedded Transmission System basis:

(a) The period the set or system is required.
(b) The planned half hourly output.
(c) Any other information the DNO reasonably considers necessary.

DOC2.6.6 Control Phase (0 to 24 hours ahead)

During the real time Operation any changes to the outage programme for the day shall be at the discretion of the DNO.

DOC2.7 Nuclear Generating Plant

DOC2.7.1 The DNO will endeavour to give as much notice as possible to a Generator with Nuclear Generating Plant which may be operationally affected by an outage which is to be included in a programme referred to in DOC2.6.4.1.

DOC2.7.2 Where a Generator with Nuclear Generating Plant which may be operationally affected by the DNO’s Distribution System outage programme referred to in DOC2.6.4.1 (acting as a reasonable operator) is concerned on grounds relating to safety about the effect which an outage within such outage programme might have on one or more of its Nuclear Generating Plant, it may contact the DNO to explain its concerns and discuss whether there is an alternative way of taking that outage (having regard to technical feasibility). If there is such an alternative way, but the DNO refuses to adopt that alternative way in taking that outage, the Generator may involve the Electricity Supply Industry (ESI) disputes resolution procedure to decide on the way the outage should be taken. If there is no such alternative way, then the DNO may take the outage despite that Generator’s concerns.
OPERATIONAL PLANNING - LONG TERM PLANNING PHASE (YEAR 3 AHEAD)

The requirements of the Long Term Programme apply to Embedded Generating Plant and Embedded Transmission System connected to the DNO’s Distribution System specified in DOC2.3.

EACH CALENDAR YEAR BY:-

WEEK 2  Embedded Generators provide the DNO with a provisional Embedded Generating Plant or Embedded Transmission System outage programme for Year 3 ahead specifying the Generation Set and MW concerned, the preferred date for each proposed outage, and where there is a possibility of flexibility, the earliest start date and latest finishing date where applicable.

WEEK 12  The DNO will provide the Embedded Generators with details of constraints on the DNO’s Distribution System and potential DNO’s Distribution System requirements during each week of Years 3 ahead for an outage together with their perceived Output Usable requirements for Year 3 ahead.

WEEK 25  Embedded Generators will provide the DNO with updated provisional Embedded Generating Plant or Embedded Transmission System outage programmes together with the Registered Capacity and neutral weekly Output Usable forecasts in both cases for Year 3 ahead.

WEEK 28  The DNO after discussion with the Embedded Generator will notify each Embedded Generator with details of any suggested revisions the DNO proposes to the provisional Embedded Generating Plant or Embedded Transmission System outage programme previously supplied and the reasons for such proposed revisions including such information as provided in week 12.

Users will provide the DNO with details of proposed outages in Year 3 ahead which may affect the performance of the DNO’s Distribution System. This information need not be limited to Plant Apparatus and System at the DNO interface. Details will comprise general outage requirements, start and end dates.

WEEK 42  The DNO after discussions with the Embedded Generator will notify each Embedded Generator with details of any suggested revisions necessary to maintain DNO System security to the updated provisional Embedded Generating Plant or Embedded Transmission System outage programme previously supplied.

WEEK 43  Following consultation with Users, the DNO will include these outage proposals in the Long Term Programme.
OPERATIONAL PLANNING - MEDIUM TERM PROGRAMME (YEARS 1 & 2)

The requirements of the Medium Term Programme apply to Embedded Generating Plant and Embedded Transmission System connected to the DNO’s Distribution System as specified in DOC2.3.

EACH CALENDAR YEAR BY:-

WEEK 2  Embedded Generators not included in the Long Term Programme shall provide the DNO with a provisional Embedded Generating Plant or Embedded Transmission System outage programme for Years 1 and 2 specifying the Generation Set and MW concerned, the preferred date for each proposed outage, where applicable earliest start date and latest finishing date.

WEEK 10  Embedded Generators provide the DNO with estimates of Output Usable for each Embedded Generating Plant or Embedded Transmission System for Year 1 and 2 (weeks 1 to 52) and its proposed Generation Set and/or System outage programme for Years 1 and 2.

WEEK 12  The DNO will after discussion with the Embedded Generator provide the appropriate Embedded Generator with details of DNO’s Distribution System constraints and potential DNO’s Distribution System requirements during each week of Years 1 and 2 for an outage together with any suggested changes to its proposed Generation Set or Embedded Transmission System outage programme.

The DNO will notify each Embedded Generator of Output Usable requirements for Years 1 and 2 (weeks 1 to 52).

WEEK 28  Users within the DNO’s distribution services area will provide the DNO with details of outages due to take place during the Years 1 and 2 which may affect the performance of the DNO’s Distribution System. This will comprise updating the programme for Years 3 ahead where appropriate and including any subsequent requests.

In addition to outage proposals, the programme shall include Trip Testing, Risks of Trip, and other information where known which may affect the security and stability of the DNO’s Distribution System.

WEEK 41  Each Embedded Generator will provide the DNO with revised estimates of the Output Usable of each Embedded Generating Plant or Embedded Transmission System for Year 1 and 2 (weeks 1 to 52).

WEEK 48  Following consultation with Users, the DNO will include their proposals in the Medium Term Plan.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 2

DOC 2 - APPENDIX 3

OPERATIONAL PLANNING - SHORT TERM (CURRENT YEAR 52 WEEKS AHEAD DOWN TO 9 WEEKS AHEAD)

The Short Term Plan will be an update of the Medium Term Plan and comprise a receding period as the Programming Phase (24 hours to 8 weeks ahead inclusive) evolves through the current year.

EACH CALENDAR YEAR

WEEK 2 Embedded Generators not included in the Medium Term Plan will provide the DNO with a provisional Embedded Generating Plant or Embedded Transmission System outage programme for the current calendar year specifying the Embedded Generating Plant or Embedded Transmission System and MW concerned, duration of the outage, earliest start date and latest finishing date where applicable. Embedded Generators will also provide the DNO with revised estimates of Embedded Generating Plant or Embedded Transmission System Output Usable for weeks 9 - 52.

WEEK 4 DNO will inform Embedded Generators of Output Usable requirements for weeks 9 - 52.

WEEK 10 Embedded Generators will provide the DNO with estimates of each Embedded Generating Plant or Embedded Transmission System Output Usable for weeks 18 - 52.

WEEK 12 The DNO will inform Embedded Generators of their desired changes Embedded Generator to Output Usable requirements for weeks 18 - 52 and will provide details of DNO’s Distribution System constraints and DNO’s Distribution System requirements.

WEEK 25 Embedded Generators will provide the DNO with estimates of each Embedded Generating Plant or Embedded Transmission System Output Usable for weeks 28 - 52.

WEEK 27 The DNO will inform Embedded Generators of changes to Output Usable requirements for weeks 31 - 52.

WEEK 41 Embedded Generators will provide the DNO with estimates of each Embedded Generating Plant or Embedded Transmission System Output Usable for weeks 44 - 52.

WEEK 43 The DNO will inform Embedded Generators of changes to Output Usable requirements for weeks 44 - 52.

An update of Users proposals agreed in the Medium Term Plan will be included in the Short Term Programming Phase.
Figure 1
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 5

DOC5 TESTING AND MONITORING

DOC5.1 Introduction

DOC5.1.1 To ensure that the DNO’s Distribution System is operated efficiently and within its licence standards and to meet statutory actions the DNO will organise and carry out testing and/or monitoring of the effect of Users’ electrical apparatus on the DNO’s Distribution System.

DOC5.1.2 The testing and/or monitoring procedures will be specifically related to the technical criteria detailed in the Distribution Planning and Connection Code. They will also relate to the parameters submitted by Users in the Distribution Data Registration Code.

DOC5.1.3 This DOC5 also covers the testing requirements that might be imposed from time to time on Embedded Medium Power Stations owned by a Generator who is not party to the CUSC.

DOC5.1.4 The testing carried out under this Distribution Operating Code (DOC5) should not be confused with the more extensive System Test outlined in DOC12.

DOC5.2 Objective

DOC5.2.1 The objective of this Distribution Operating Code is to specify the DNO’s requirement to test and/or monitor its DNO’s Distribution System to ensure that Users are not operating outside the technical parameters required by the Distribution Planning and Connection Code and/or the Distribution Operating Codes.

DOC5.3 Scope

DOC5.3.1 This Distribution Operating Code applies to the following Users of the DNO’s Distribution System:-

(a) Customers (it is not intended that the Distribution Code will necessarily apply to small Customers individually - their obligations will generally be dealt with on their behalf by their Supplier).

(b) Embedded Generators.

(c) Other Authorised Distributor connected to the DNO’s Distribution System.

(d) Suppliers.

(e) Meter Operators.

DOC5.4 Procedure Related to Quality of Supply

DOC5.4.1 The DNO will from time to time determine the need to test and/or monitor the quality of supply at various points on its DNO’s Distribution System.

DOC5.4.2 The requirement for specific testing and/or monitoring may be initiated by the receipt of complaints as to the quality of supply on the DNO’s Distribution System.

89

September 2013
In certain situations the DNO may require the testing and/or monitoring to take place at the point of connection of a User with the DNO’s Distribution System.

Where testing and/or monitoring is required at the Connection Point, the DNO will advise the User involved and will make available the results of such tests to the User.

Where the results of such tests show that the User is operating outside the technical parameters specified in the Distribution Planning and Connection Code, the User will be informed accordingly.

Where the User requests, a retest will be carried out and the test witnessed by a User representative.

A User shown to be operating outside the limits specified in Distribution Planning and Connection Code will rectify the situation or disconnect the Apparatus causing the problem from its electrical System connected to the DNO’s Distribution System immediately or within such time as is agreed with the DNO.

Continued failure to rectify the situation will result in the User being disconnected or de-energised in accordance with the Connection Agreement from the DNO’s Distribution System either as a breach of the Distribution Code or through the authority of the ESQCR, where appropriate.

The DNO from time to time will monitor the effect of the User on the DNO’s Distribution System.

The monitoring will normally be related to amount of Active Power and Reactive Power transferred across the Connection Point.

Where the User is exporting to or importing from the DNO’s Distribution System Active Power and Reactive Power in excess of the parameters in the Connection Agreement the DNO will inform the User and where appropriate demonstrate the results of such monitoring.

The User may request technical information on the method of monitoring and, if necessary, request another method reasonably acceptable to the DNO.

Where the User is operating outside the specified parameters, the User will immediately restrict the Active Power and Reactive Power transfers to within the specified parameters.

Where the User requires increased Active Power and Reactive Power in excess of the physical capacity of the Connection Point the User will restrict power transfers to those specified in the Connection Agreement until a modified Connection Agreement has been applied for from the DNO and physically established.
DISTRIBUTION OPERATING CODE (DOC)

DOC5.6 Grid Code Compliance for Medium Power Stations not subject to an embedded generation agreement

DOC5.6.1 Procedure For Compliance

DOC5.6.1.1 NGC may, from time to time, but generally not more than twice in any calendar year, request that the DNO procure from the Generator a statement confirming compliance with the relevant Grid Code Connection Conditions at the Embedded Medium Power Station not subject to an embedded generation agreement in question. Such requests will generally, but not necessarily, be contingent on the issues raised in DOC6.5.3.3 below.

DOC5.6.1.2 On request from the DNO, in furtherance of DOC5.6.1.1 above or at other times not generally more than twice per calendar year, the Generator will provide to the DNO a statement with appropriate supporting evidence of compliance with the relevant Grid Code requirements. The DNO will immediately submit this information to NGC. The Generator is at liberty to submit the data directly to NGC, but a copy must be submitted in parallel to the DNO.

DOC5.6.1.3 In the event that in NGC's view an Embedded Medium Power Station fails persistently to comply with the Grid Code Connection Conditions NGC shall notify the DNO giving details of the failure and of the monitoring that NGC has carried out.

DOC5.6.1.4 The DNO will notify the Generator responsible for the Embedded Medium Power Station in question as soon as possible, and in any case within 2 working days of all the facts contained in the NGC notice.

DOC5.6.1.5 The Generator responsible for the Embedded Medium Power Station in question will, as soon as possible, provide the DNO with an explanation of the reasons for the failure and details of the action that it proposes to take to comply with the Grid Code Connections Conditions within a reasonable period.

DOC5.6.1.6 NGC, the DNO and the Generator will then discuss the action the Generator proposes to take and will endeavour to reach agreement as to:

(a) any short term operational measures necessary to protect other Users; and

(b) the parameters which are to be submitted for the Generation Set and the effective date(s) for the application of the agreed parameters.

DOC5.6.2 Procedure for Testing

DOC5.6.2.1 Subject to the provisions of DOC5.6.1 should the DNO fail to procure a notice of compliance to NGC’s reasonable satisfaction, NGC may at any time (although not generally more than twice in any calendar year in respect of any particular Embedded Medium Power Station not subject to an embedded generation agreement issue an instruction requiring the DNO to facilitate a test, provided NGC has reasonable grounds of justification based upon:

(a) a submission of data in respect of the relevant Embedded Medium Power Station indicating a change in performance; or

(b) a statement from the DNO or Generator indicating a change in performance; or
DISTRIBUTION OPERATING CODE (DOC)

(c) monitoring by NGC, whether or not carried out in accordance with DOC5.6.1.3 above; or

(d) notification from the DNO of completion of an agreed action from DOC5.6.1 above.

DOC5.6.2.2 The test referred to in DOC5.6.2.1 on any one or more of the Generation Sets comprising part of the relevant Embedded Medium Power Station should only be to demonstrate that:

(a) the relevant Generation Set meets the requirements of the paragraphs in the Grid Code Connection Conditions which are applicable to such Generation Sets or Power Station; or

(b) the relevant Generation Set meets the requirements for operation in Limited Frequency Sensitive Mode in accordance with CC.6.3.3, BC3.5.2 and BC3.7.2,

DOC5.6.2.3 The instruction referred to in DOC5.6.2.1 may only be issued where, following consultation and the preparation of a mutually agreed testing plan (to include prevailing economic conditions etc) and timetable between the DNO, Generator and NGC, NGC has:

(a) confirmed to the DNO and Generator the manner in which the test will be conducted, which shall be consistent with the principles established in DOC5.6.3; and

(b) received confirmation from the DNO that the relevant Generation Set would not then be unavailable by reason of forced outage or Planned Outage expected prior to the instruction.

DOC5.6.3 Conduct of Test

DOC5.6.3.1 The Generator is responsible for carrying out the test when requested by the DNO following a valid request from NGC in accordance with DOC5.6.2.1 and the Generator retains the responsibility for the safety of personnel and plant during the test.

DOC5.6.3.2 The performance of the Generation Set concerned will be recorded at NGC and/or DNO Control Centres with monitoring at site as and when necessary during the test.

DOC5.6.3.3 If monitoring at site is undertaken, the performance of the Generation Set will be recorded on a suitable recorder (with measurements taken as appropriate on the Generation Set Stator Terminals / on the LV side of the generator transformer) in the relevant User’s Control Centre, in the presence of a reasonable number of representatives appointed and authorised by NGC. If NGC or the DNO or the Generator requests, monitoring at site will include measurement of the following parameters during the test:

(a) for Steam Turbines: governor pilot oil pressure, valve position and steam pressure; or

(b) for Gas Turbines: Inlet Guide Vane position, Fuel Valve positions, Fuel Demand signal and Exhaust Gas temperature; or

(c) for Hydro Turbines: Governor Demand signal, Actuator Output signal, Guide Vane position; and/or
DISTRIBUTION OPERATING CODE (DOC)

(d) for Excitation Systems: Generator Field Voltage and Power System Stabiliser signal where appropriate.

DOC5.6.3.4 The relevant test parameters and the pass/fail criteria shall be drawn from Section OC5.5.3 of the Grid Code.

DOC5.6.4 Test Failure/Re-test

DOC5.6.4.1 If the Generation Set concerned fails to pass the test the Generator must provide the DNO and NGC with a written report specifying in reasonable detail the reasons for any failure of the test so far as they are then known to the Generator after due and careful enquiry.

DOC5.6.4.2 The DNO has the responsibility under the Grid Code to forward the report of DOC5.6.4.1 above to NGC. This report must be provided within five Business Days of the test. If a dispute arises relating to the failure, NGC, the DNO and the Generator shall seek to resolve the dispute by discussion, and, if they fail to reach agreement, either of the DNO or Generator may by notice respectively:

(a) require NGC to initiate a re-test on 48 hours’ notice which shall be carried out following the procedure set out in OC5.5.2 and OC5.5.3 and subject as provided in OC5.5.1.3, as if NGC had issued an instruction at the time of notice from the relevant User; or

(b) confirm that it (or they) will exercise its right to carry out a re-test on 48 hours’ notice which shall be carried out following the procedure set out in Grid Code Sections OC5.5.2 and OC5.5.3 and subject as provided in Grid Code Sections OC5.5.1.6, as if NGC had issued an instruction at the time of notice from the DNO.

DOC5.6.5 Dispute following Re-test

DOC5.6.5.1 If the Generation Set in NGC’s view fails to pass the re-test and a dispute arises on that re-test, NGC, the DNO and the Generator may use the CUSC Disputes Resolution Procedure, (which embodies the ESI disputes resolution procedure) for a ruling in relation to the dispute, which ruling shall be binding.

DOC5.6.6 Dispute Resolution

DOC5.6.6.1 If following the procedure set out in DOC5.6.5 it is accepted that the Generation Set has failed the test or re-test (as applicable), the Generator shall within 14 days, or such longer period as NGC may reasonably agree, following such failure, submit in writing to the DNO for submission to NGC for approval the date and time by which the Generator shall have brought the Generation Set concerned to a condition where it complies with the relevant requirement.

DOC5.6.6.2 Should NGC not approve the Generator’s, proposed date or time (or any revised proposal), the Generator shall amend such proposal having regard to any comments NGC and/or the DNO may have made and re-submit it for approval.

DOC5.6.6.3 If the Generation Set fails the test the Generator shall resubmit to the DNO the relevant registered parameters of that Generation Set for the period of time until the Generation Set can achieve the parameters previously registered, as demonstrated (if required by NGC in accordance with DOC5.6.6.4) in a re-test. The DNO will submit these parameters to NGC as required by the Grid Code.
DOC5.6.6.4 Once the Generator, has indicated to NGC via the DNO the date and time that the Generation Set can achieve the parameters previously registered or submitted, NGC shall either accept this information or require the Generator to demonstrate the restoration of the capability by means of a repetition of the test referred to in DOC5.6.7 by an instruction requiring the DNO to ensure on 48 hours’ notice that such a test is carried out by the Generator.

DOC5.6.6.5 The provisions of this DOC5.6.6 will apply to such further test.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 6

DOC6 DEMAND CONTROL

DOC6.1 Introduction

DOC6.1.1 This Distribution Operating Code DOC6 is concerned with the provisions to be made by the DNO and Users with Systems connected to the DNO’s Distribution System in certain circumstances, to permit reductions in Demand in the event of insufficient Generating Plant, and transfers from External Interconnections being available to meet Demand or to avoid disconnection of Customers or in the event of breakdown and/or operating problems (such as in respect of System Frequency, System voltage levels or System thermal overloads) on any part of the National Electricity Transmission System and/or the DNO’s Distribution System.

DOC6.1.2 This Distribution Operating Code deals with the following methods of Demand Control:-

(a) Customer Demand reduction, including Voltage Reduction, initiated by the DNO.
(b) Customer Demand reduction instructed by NGC.
(c) Automatic low frequency Demand disconnection.
(d) Emergency manual Demand disconnection.

The term “Demand Control” is used to describe any or all of these methods of achieving a Demand reduction.

Data relating to Demand Control should be expressed in MW.

DOC6.1.3 The situation where it is necessary to reduce Demand due to Civil Emergencies is dealt with in Distribution Operating Code, DOC9.

The Electricity Supply Emergency Code issued by the Department of Energy in November 1999 (as amended from time to time) provides that in certain circumstances consumers are given a certain degree of “protection” when rota disconnections are implemented pursuant to a direction under the Energy Act 1976. No such protection can be given under the Grid Code or this section of the Distribution Code.

DOC6.1.4 Connections between Power Stations comprising Generation Set(s) which comprise or contain BM Units which are active (ie. submitting bid-offer data) in the Balancing Mechanism and a DNO’s Distribution System will not, as far as is possible, be disconnected by a DNO pursuant to the provisions of DOC6 insofar as that would interrupt supplies.

(a) For the purpose of operation of the Power Station (including start-up and shutting down).

(b) For the purposes of keeping the Power Station in a state that it could be started-up when it is off-load for ordinary operational reasons.

(c) For the purpose of compliance with the requirements of a Nuclear Site Licence.
Demand Control pursuant to this DOC6 therefore applies subject to this exception.

DOC6.1.5 The control of Demand Control between the DNO’s Distribution System and the National Electricity Transmission System will be carried out in accordance with Operating Code of the Grid Code and is outwith the scope of this Distribution Operating Code.

DOC6.2 Objective

To establish procedures to enable the DNO, following an instruction of NGC or otherwise, to achieve reduction in Demand that will either avoid or relieve operating problems on the National Electricity Transmission System and/or the DNO’s Distribution System, in whole or in part in a manner that does not discriminate against or unduly prefer any one or any group of Suppliers or their Customers or Other Authorised Distributors in accordance with the Distribution Licence.

DOC6.3 Scope

This Distribution Operating Code will apply to the DNO and to Users which in this Distribution Operating Code means:

(a) Customers (it is not intended that the Distribution Code shall apply to small Customers individually).

(b) Embedded Generators.

(c) Other Authorised Distributor connected to the DNO’s Distribution System.

DOC6.3.2 Implementation of Demand Control by the DNO may affect all Suppliers’ Customers and where applicable, contractual arrangements between Suppliers and their Customers may need to reflect this.

DOC6.4 Operational System Load Reduction Arrangements

DOC6.4.1 The DNO will arrange within its DNO’s Distribution System a scheme to reduce load in a controlled manner by reducing voltage and/or by disconnecting Customers and/or Users.

DOC6.4.2 A System of warnings will be contained within the load reduction arrangements to give notice, wherever practical, of impending implementation.

DOC6.4.3 The DNO will arrange to have available within the DNO’s Distribution System, four stages of Demand Control in integral multiples of between four and six per cent. These stages may include the use of Voltage Reduction and/or other forms of Demand Control determined by the DNO.

DOC6.4.4 The groups will be arranged so that disconnection can take place uniformly across the DNO’s Distribution System, and as far as practicable uniformly between Grid Supply Points.

DOC6.4.5 The DNO will arrange to have available a scheme to implement a further four 5% stages of Demand Control upon receipt of a suitable warning from NGC which will be issued by 1600 hrs on the previous day.
The DNO will arrange to have available a scheme to implement further twelve 5% stages of Demand Control.

DOC6.4.6 Embedded Generators, Suppliers, Customers and Other Authorised Distributors connected to the DNO’s Distribution System will need to be considered in the preparation of DNO’s Demand Control schemes.

DOC6.4.7 The DNO shall issue instructions to such Users of the DNO’s Distribution System who are required to disconnect or reconnect and the User shall carry out the instructions without delay.

DOC6.4.8 Once a disconnection has been applied at the instruction of the DNO, the User shall not reconnect until the DNO instructs the User to do so in accordance with this Distribution Operating Code.

DOC6.4.9 The Users shall abide by the instructions of the DNO with regard to reconnection under this Distribution Operating Code without delay.

DOC6.4.10 Where disconnection is envisaged by the DNO to be prolonged, the DNO may utilise disconnection rotas where 5 per cent groups are interchanged to ensure (so far as practicable) equitable treatment of Customers, provided that the proportion of total Demand disconnected at all times does not change.

DOC6.5 Automatic Low Frequency Demand Disconnection

DOC6.5.1 The DNO shall provide automatic low frequency disconnection in stages by tripping relays to disconnect at least 40% of the DNO’s Distribution System Peak Demand in Scotland and 60% of the DNO’s Distribution System Peak Demand in England and Wales (based on the winter peak value), in order to seek to limit the consequences of the loss of a major source of generation or an Event on the National Electricity Transmission System which leaves part of the Total System with a generation deficit.

DOC6.5.2 The Demand subject to automatic low frequency disconnection shall be split into discrete blocks. The number, location and size of the blocks and the associated low frequency settings will be as specified by the DNO. The intention is that the distribution of the blocks will be such as to give a reasonably uniform application throughout the DNO’s Distribution System, but may take into account any operational requirements and the essential nature of certain Demand.

DOC6.5.3 Where conditions are such that, following automatic low frequency disconnection, it is not possible to restore all or a great proportion of those Customers so disconnected within a reasonable period of time, the DNO may instruct, at any time, further manual load disconnection and instruct a portion of the Customers which were disconnected by automatic low frequency disconnection to be restored in order that any further fall in Frequency will be contained by operation of automatic low frequency disconnection.

DOC6.5.4 Once an automatic low frequency disconnection has taken place, it shall not be reconnected until the DNO instructs to do so in accordance with this Distribution Operating Code.
DISTRIBUTION OPERATING CODE (DOC)

DOC6.5.5 Each Supplier and Other Authorised Distributor shall abide by the instructions of the DNO with regard to reconnection under this Distribution Operating Code without delay.

DOC6.5.6 In addition, Embedded Generators may wish to disconnect, automatically or manually, their plant from the System to which it is connected at certain frequency levels. Any such disconnection will be agreed with the DNO on connection to the DNO’s Distribution System in accordance with the Distribution Planning and Connection Code.

DOC6.6 Emergency Manual Disconnection of Demand

DOC6.6.1 The DNO shall make such arrangements as are necessary to enable it to disconnect Customers under emergency conditions irrespective of frequency.

DOC6.6.2 The DNO shall annually, by the end of September, prepare schedules with details, on a Grid Supply Point basis and including arrangements with Users, of the percentage block of Demand at that Grid Supply Point available for manual disconnection, the method of disconnection to be used and the timescale of the implementation of disconnection of each block.

DOC6.6.3 The scheme will be designed to be called into operation irrespective of System Frequency, and to be implemented in predetermined timescales to disconnect Demand progressively.

DOC6.6.4 Customers and Other Authorised Distributors may be required to provide manual disconnection facilities. Where required by the DNO to disconnect load, each Customer or Other Authorised Distributor shall abide by the instructions of the DNO with regard to disconnection under this Distribution Operating Code without delay and the instructed disconnection must be completed without undue delay.

DOC6.6.5 Once a disconnection has been applied at the instruction of the DNO reconnection shall not be applied until the DNO instructs it to be done in accordance with this Distribution Operating Code.

DOC6.6.6 Each Customer and Other Authorised Distributor shall abide by the instructions of the DNO with regard to reconnection under this Distribution Operating Code without delay.

DOC6.7 Co-ordination of Actions

DOC6.7.1 Where Demand Control is exercised by the DNO in order to safeguard the DNO’s Distribution System the DNO will liaise with and inform Users accordingly so far as is practical.

DOC6.7.2 Where Demand Control is exercised by the DNO on instruction or request from NGC in order to safeguard the Total System then the DNO is required to respond to these requests promptly but will liaise with and inform other Users so far as is practical.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 7

DOC7 OPERATIONAL LIAISON

DOC7.1 Introduction

DOC7.1.1 This Distribution Operating Code DOC7 sets out the requirements for the exchange of information in relation to Operations and/or Events on the DNO’s Distribution System and on the immediately adjacent parts of adjoining Systems which have had (or may have had), or will have (or may have) an Operational Effect.

(a) on the DNO’s Distribution System or on the System of any other User in the case of an Operation and/or Event occurring on the System of a User, and

(b) on the System of a User in the case of an Operation and/or Event occurring on the DNO’s Distribution System or the National Electricity Transmission System,

where no requirement for liaison is specified in any other section of the Distribution Code.

DOC7.1.2 The requirement to notify in DOC7 relates generally to communicating what has happened or what is to happen and not the reasons why. However, DOC7 provides, when an Event has occurred on the DNO’s Distribution System which itself has been caused by (or exacerbated by) an Operation or Event on a User’s System, the DNO in reporting the Event on the DNO’s Distribution System to a User can pass on what it has been told by the User in relation to the Operation on that User’s System.

DOC7.2 Objective

To provide for the exchange of information so that the implications of the Operation and/or Event can be considered and the possible risks arising from it can be assessed and appropriate action taken by the relevant party in order to maintain the integrity of the Total System and the User’s System. This Distribution Operating Code does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

DOC7.3 Scope

This Distribution Operating Code applies to the DNO and to Users, which in this Distribution Operating Code means:-

(a) High Voltage Customers.

(b) Embedded Generators connected to the DNO’s Distribution System at HV.

(c) Other Authorised Distributors connected to the DNO’s Distribution System at HV.

(d) Suppliers on behalf of their Customers where appropriate.
DISTRIBUTION OPERATING CODE (DOC)

DOC7.4  Communications

DOC7.4.1 The DNO and each User connected to the DNO’s Distribution System will establish communication channels to make effective the exchange of information required by DOC7.

DOC7.4.2 Communication should, as far as possible, be direct between the User and the operator of the network to which that User is connected.

DOC7.4.3 Information between a DNO and Users will be exchanged on the reasonable request of either party. The request may follow a specific Operation or Event, or be in accordance with a prior agreement to exchange information on particular types of Operation or Event.

This does not preclude the voluntary exchange of information which may be perceived as being relevant to the operation of the DNO or User System, in accordance with good operating practice.

DOC7.5  Requirement to notify Operations

DOC7.5.1 Notification Requirements

DOC7.5.1.1 In the case of an Operation on the DNO’s Distribution System or on receipt of notification of an Operation on the National Electricity Transmission System, which will have or may, in the opinion of the DNO, have an Operational Effect on the System of a User connected to the DNO’s Distribution System, the DNO will notify the User in accordance with DOC7.

DOC7.5.1.2 In the case of an Operation on the System of a User connected to the DNO’s Distribution System, which, in the opinion of the User, will have or may have an Operational Effect on the DNO’s Distribution System, the User will notify the DNO in accordance with DOC7.

DOC7.5.1.3 An Operation may be caused by another Operation or an Event on another’s System and in such situations the information to be notified is different from that where the Operation arose independently of any other Operation or Event.

DOC7.5.1.4 Whilst in no way limiting the general requirement to notify in advance as set out in this part of this Distribution Operating Code, DOC7.5, the following are examples of circumstances where notification may be required in accordance with this Distribution Operating Code:-

(a) The implementation of a scheduled outage of Plant and/or Apparatus which has been arranged pursuant to Distribution Operating Code DOC2.

(b) The Operation (other than, in the case of a User, at the instruction of the DNO) of a circuit breaker or isolator or any sequence or combination of the two, including any temporary over-stressing, System parallels, or Generation Set synchronising.

(c) Voltage control.

100   September 2013
DISTRIBUTION OPERATING CODE (DOC)

DOC7.5.2 Form of Notification

DOC7.5.2.1 A notification under DOC7.5.1 will be of sufficient detail to describe the Operation, although it need not state the cause, and to enable the recipient of the notification reasonably to consider and assess the implications and risks arising and will include the name of the individual reporting the Operation on behalf of the DNO or the User, as the case may be. The recipient may seek clarification of the notification.

DOC7.5.2.2 The notification may be written or oral. Written notification must be of an immediate form such as electronic mail. Where the notification is oral, it shall be written down by the sender and be dictated to the recipient who shall write it down and repeat each phrase as received and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

DOC7.5.3 Timing

A notification under DOC7.5.12 shall be given in sufficient time as will reasonably allow the recipient to consider and assess the implications and risks arising, and to undertake mitigating actions.

DOC7.6 Requirement to Notify Events

DOC7.6.1 Notification Requirements

DOC7.6.1.1 In the case of an Event on the DNO’s Distribution System or on receipt of notification of an Event on the National Electricity Transmission System, which, in the opinion of the DNO, might have had or will have an Operational Effect on the System of a User connected to the DNO’s Distribution System, the DNO will notify the User in accordance with this DOC7. This does not preclude any User asking the DNO, to whose System he is connected, for information regarding the Event which has affected the User’s System.

DOC7.6.1.2 In the case of an Event on the System of a User connected to the DNO’s Distribution System, which has had or may have had an Operational Effect on the DNO’s Distribution System or on the National Electricity Transmission System, the User will notify the DNO in accordance with this DOC7.

DOC7.6.1.3 An Event may be caused by (or exacerbated by) another Event or by an Operation on another’s System and in that situation the information to be notified is different from that where the Event arose independently or any other Event or Operation.

DOC7.6.1.4 Whilst in no way limiting the general requirement to notify set out in this part of this Distribution Operating Code, DOC7.6, the following are examples of circumstances where notification may be required in accordance with this Distribution Operating Code:-

(a) Where Plant and/or Apparatus is being operated in excess of its capability or may present a hazard to personnel.

(b) The actuation of an alarm or indication of an abnormal operating condition.

(c) Adverse weather conditions being experienced or forecast.
(d) Breakdown of, or faults on, or temporary changes in the capabilities of, **Plant** and/or **Apparatus** including **Protection** control, communications and metering equipment.

(e) Increased risk of inadvertent **Protection** operation.

**DOC7.6.2** Form of Notification

**DOC7.6.2.1** A notification under DOC7.6.1 of an **Event**, although it need not state the cause, shall be of sufficient detail to enable the recipient of the notification to reasonably consider and assess the implications and risks arising. Details of the **Event** should include the timescale and the probability of repeat occurrences within a period. The recipient may seek clarification of the notification.

**DOC7.6.2.2** The notification may be written or oral. Written notification must be of an immediate form such as electronic mail. Except in an emergency situation any oral notification shall, be written down by the sender and dictated to the recipient who shall write it down and repeat each phrase as received and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

**DOC7.6.3** Timing

A notification under DOC7.6.1 shall be given as soon as practicable after the occurrence of the **Event**, or time that the **Event** is known of or anticipated by the giver of the notification under this **Distribution Operating Code** DOC7.

**DOC7.7** System Control

**DOC7.7.1** Where a part of a **DNO’s Distribution System** is, by agreement, under the **System Control** of the **National Electricity Transmission System Control Centre** then the requirements and provisions of the **Grid Code** shall apply to that situation as if that **DNO’s Distribution System** was the **National Electricity Transmission System**.

**DOC7.7.2** Where a part of a **User’s System** is, by agreement, under the **System Control** of a **Distribution Control Centre** the **DNO**, then the requirements and provisions of this **Distribution Operating Code** shall apply to that situation as if that **System** was part of the **DNO’s Distribution System**.

**DOC7.8.** Significant Incidents

**DOC7.8.1** Where an **Event** on the **DNO’s Distribution System** or the **National Electricity Transmission System** or the **System** of a **User**, in the opinion of the **DNO**, has had or may have had a significant effect on the **System** of any of the others, the **Event** shall be reported in writing to the owner of the **System** affected in accordance with the provisions of **Distribution Operating Code** DOC10. Such an **Event** will be termed a “**Significant Incident**”.

**DOC7.8.2** Where the **DNO** notifies a **User** of an **Event** under DOC7, which the **User** considers has had or may have a significant effect on that **User’s System**, that **User** will require the **DNO** to report that **Event** in writing and will notify the **DNO** accordingly. Such an **Event** will also be termed a “**Significant Incident**”.

September 2013
DOC7.8.3 Without limiting the general description set out in DOC7.8.1 or DOC7.4.10.2 a Significant Incident will include Events which result in, or may result in, the following:

(a) Voltage outside statutory limits.
(b) System Frequency outside statutory limits.
(c) System instability.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 8

DOC8 SAFETY CO-ORDINATION

DOC8.1 Introduction

DOC8.1.1 This Distribution Operating Code DOC8 specifies the Safety Management System criteria to be applied by the DNO and Users for the co-ordination, establishment and maintenance of necessary Safety Precautions when work or testing is to be carried out on Plant and/or Apparatus of the DNO or a User and where for this to be done safely, isolation on and/or earthing of the other’s System is needed. This Distribution Operating Code does not apply to the situation where Safety Precautions need to be agreed solely between Users.

DOC8.1.2 This Distribution Operating Code does not seek to impose a particular set of Safety Rules on the DNO and Users. The Safety Rules to be adopted and used by the DNO and each User shall be those chosen by each.

DOC8.2 Objectives

To lay down requirements with a view to ensuring safety of persons working at or across Operational and Ownership Boundaries between the DNO’s Distribution System and Users’ Systems.

DOC8.3 Scope

This Distribution Operating Code DOC8 specifies the Safety Management System criteria to be applied by the DNO and all Users of the DNO’s Distribution System at or across an Operational Boundary, Users for the purposes of this Distribution Operating Code being:-

(a) High Voltage Customers.
(b) Embedded Generators, but excluding the OTSO.
(c) Other Authorised Distributors connected to the DNO’s Distribution System.
(d) Meter Operators.
(e) Any other party reasonably specified by the DNO including Users with Unmetered Supply and those connected at Low Voltage for appropriate sections of DOC8 where necessary.

DOC8.4 Operational Safety

DOC8.4.1 Approved Safety Management Systems

DOC8.4.1.1 At each site or location where an Operational Boundary exists, a Safety Management System specifying the principles and procedures to be applied so as to ensure the health and safety of all who are liable to be working or testing on the DNO’s Distribution System, or on Plant and Apparatus connected to it, will be established by the DNO and Users. For interfaces involving HV Systems this shall include the provision for Control Person(s), a system of documentation and the establishment of Safety Precautions.
DISTRIBUTION OPERATING CODE (DOC)

DOC8.4.2  Authorised Persons

DOC8.4.2.1  The DNO and every User shall at all times have nominated a person or persons to be responsible for the co-ordination of safety pursuant to this Distribution Operating Code, those persons being referred to in this Distribution Operating Code as Control Persons. (Under the conditions of the DNO’s Safety Rules a Control Person may either be at the DNO’s Distribution Control Centre or be a person authorised in accordance with DOC8.4.2.2, who is at the site or location of the Operational Boundary).

DOC8.4.2.2  Control Persons and persons concerned with the carrying out of Safety Precautions and work on or testing of Plant and Apparatus forming part of, or connected to, the DNO’s Distribution System shall have a written authorisation designating their role in implementing the Safety Management System.

DOC8.4.2.3  The written authorisation shall indicate the class of Operation and/or the class of work permitted and the parts of the System, the DNO and/or Users, to which the written authorisation shall apply.

DOC8.4.3  System of Documentation

DOC8.4.3.1  A system of documentation shall be maintained by the DNO and the appropriate Users which will record the inter-system Safety Precautions taken when:-

(a) Work and/or testing is to be carried out on HV Plant and/or Apparatus across the Operational Boundary.

(b) Isolation and/or earthing of the other’s System is required.

DOC8.4.3.2  Where relevant, copies of the Safety Management Systems and related documentation shall be exchanged between the DNO and Users for each Operational Boundary.

DOC8.4.3.3  The DNO and Users shall maintain a suitable system of documentation which records all relevant operational events that have taken place on the DNO’s Distribution System or any other System connected to it and the co-ordination of relevant Safety Precautions for work.

DOC8.4.3.4  All documentation relevant to the Operation of the Distribution System, and Safety Precautions taken for work or tests, shall be held by the DNO and the appropriate User for a period of not less than six months.

DOC8.4.4  Safety Precautions

The establishment of Safety Precautions involves:-

(a) the isolation from the remainder of the System of Plant and/or Apparatus, including from Low Voltage infeeds, either by an Isolating Device in the isolating position and immobilised and locked or by other means of rendering the Plant or Apparatus Isolated, and/or

(b) the earthing by way of providing a connection between a conductor and earth by using an Earthing Device which is applied and where reasonably practicable, immobilised and locked, the extent of the Safety Precautions required being determined pursuant to this Distribution Operating Code.
DISTRIBUTION OPERATING CODE (DOC)

DOC8.5  Environmental Safety

DOC8.5.1  Site Safety and Security

DOC8.5.1.1 Arrangements shall be made by the DNO and Users to ensure site safety and security as required by statutory requirements.

DOC8.5.1.2 Suitable arrangements shall be agreed between the DNO and the relevant Users to provide free and unrestricted access to the DNO’s Plant and Apparatus at substations or similar by the DNO’s personnel or their designated representatives at all times.

DOC8.5.2  Site Specific Hazards

Suitable arrangements shall be made by the DNO and/or the relevant Users to ensure that personnel are warned by an appropriate means of hazards specific to any site, before entering any area of the site. This shall include hazards that may be temporary or permanent. Where these risks include contamination or similar, suitable decontamination facilities and procedures shall be provided.

DOC8.6  Information Flow and Co-ordination

DOC8.6.1  Schedules of Responsibility

DOC8.6.1.1 The DNO and Users shall jointly agree and set down in writing schedules specifying the responsibilities for System Control of Equipment. These shall ensure that only one party is responsible for any item of Plant or Apparatus at any one time.

DOC8.6.1.2 Pursuant to the Distribution Planning and Connection Code, Site Responsibility Schedules specifying the responsibilities for ownership, operation and maintenance shall be jointly agreed by the DNO and the appropriate User(s) for each site or location where an Operational Boundary or joint responsibility exists. This will include Operation Diagrams illustrating sufficient information for Control Persons to carry out their duties which shall be exchanged by the DNO and the appropriate User.

DOC8.6.1.3 A copy of the Site Responsibility Schedules and Operation Diagrams shall be retained by the DNO and the appropriate User(s). Site Responsibility Schedules and Operation Diagrams shall be maintained by the DNO and the appropriate User(s) and exchanged as necessary to ensure that they reflect the current agreements.

DOC8.6.2  Outage Co-ordination

DOC8.6.2.1 For those Users connected at HV and having firm supply connections (provided by more than one circuit) and where the User so requests the DNO, these schedules shall identify those specified DNO circuits on which Planned Outages by the DNO shall be notified to the User. These specified circuits will be those where the DNO and the User have agreed that during outages of the specified circuits the User can introduce measures to manage critical processes or safety aspects. These specified circuits will usually operate at the voltage level at which the supply is provided and will have a significant effect on the security level of the User’s supply.
DISTRIBUTION OPERATING CODE (DOC)

DOC8.6.2.2 Those Users connected at HV and not having firm supply connections (provided by more than one circuit) may seek to obtain outage planning information through arrangements with the DNO.

DOC8.6.3 Nomination of Control Persons

The DNO and each User shall at all times have nominated a Control Person or Control Persons responsible for co-ordination of Safety From The System pursuant to this Distribution Operating Code.

DOC8.6.4 Communications

DOC8.6.4.1 Where the DNO reasonably specifies the need, suitable communication systems shall be established between the DNO and other Users to ensure the control function is carried out in a safe and secure manner.

DOC8.6.4.2 Where the DNO reasonably decides a back up or alternative routing of communication is necessary to provide for the safe and secure Operation of the DNO’s Distribution System the means shall be agreed with the appropriate Users.

DOC8.6.4.3 Schedules of telephone numbers/call signs shall be exchanged by the DNO and appropriate User to enable control activities to be efficiently co-ordinated.

DOC8.6.4.4 The DNO and appropriate Users will establish 24-hour availability of personnel with suitable authorisation where the joint operational requirements demand it.

DOC8.7 Procedures

DOC8.7.1 Pursuant to this Distribution Operating Code the Control Person and/or Authorised Persons for each of the DNO and a User relating to the place where Safety Precautions are required will contact each other to coordinate the Safety Precautions, and the Control Person requesting Safety Precautions shall be referred to as the “Requesting Control Person” and the Control Person being requested and implementing the Safety Precautions shall be referred to as the “Implementing Control Person”.

DOC8.7.2 Procedures shall be maintained by the DNO and the appropriate Users which clearly specify the responsibility for System Control of Plant and Apparatus and these shall ensure that only one Control Person is responsible for any item of Plant and Apparatus at any one time.

DOC8.7.3 The operational procedures shall be in accordance with the Safety Management System agreed between the DNO and the User(s).
DOC9 CONTINGENCY PLANNING

DOC9.1 Introduction

This Distribution Operating Code DOC9 sets out requirements and procedures relating to the following planning procedures for abnormal situations:

DOC9.1.1 Black Start

This Distribution Operating Code DOC9 covers the requirements for the implementation of Black Start recovery procedures following a Total Shutdown or Partial Shutdown of the Total System as recognised by NGC. The Black Start procedure provides for the recovery of the Total System in the shortest possible time taking into account Power Station capabilities and the operational constraints of the Total System, in accordance with the Grid Code and the requirements of NGC.

DOC9.1.2 Re-synchronising Islands

The requirements for re-synchronising parts of the Total System where there is no Total Shutdown or Partial Shutdown but parts of the Total System are out of synchronism with each other.

DOC9.1.3 Joint System Incident Procedure

The requirements for the establishment of a communication route and arrangements between responsible representatives of the DNO and Users involved in, or who may be involved in, an actual or potential serious or widespread Total System disruption which requires or may require urgent managerial response, day or night.

DOC9.1.4 Civil Emergencies

The requirements for dealing with a Civil Emergency which under the Act is any natural disaster or other emergency which, in the opinion of the Secretary of State, is or may be likely to disrupt electricity supplies. The procedures may be similar to, or separate from, the Demand reduction schemes in Distribution Operating Code DOC6.

DOC9.2 Objectives

This Distribution Operating Code sets out Contingency Planning procedures to enable co-ordination between all Users with a common approach to give uniformity of priorities to restart or to operate the Total System in abnormal situations. It also specifies requirements to be met during periods of declared civil emergencies.

DOC9.3 Scope

This Distribution Operating Code applies to the DNO and to Users which in this Distribution Operating Code means, the Users specified below with a High Voltage connection to the DNO’s Distribution System:
DISTRIBUTION OPERATING CODE (DOC)

(a) **Customers** (it is not intended that the *Distribution Code* shall apply to small Customers individually).

(b) **Embedded Generators**, but excluding the OTSO.

(c) **Other Authorised Distributors** connected to the DNO’s Distribution System.

Any actions required of Users connected at HV will be identified by the DNO and discussed with Users.

**DOC9.4 Black Start**

**DOC9.4.1 Shutdown**

**DOC9.4.1.1** During a **Total Shutdown** or **Partial Shutdown** and during the subsequent recovery the Security Standards set out in, or deriving authority pursuant to, the **Transmission Licence** and the **Distribution Licence** may not apply and the **Total System** may be operated outside normal voltage and **Frequency** standards.

**DOC9.4.1.2** In a **Total Shutdown** or **Partial Shutdown**, it may be necessary for NGC to issue Emergency Instructions and it may be necessary to depart from the normal **Balancing Mechanism** operation in issuing Bid-Offer Acceptances.

**DOC9.4.1.3** Certain **Embedded Power Stations** are registered by NGC, as having the ability of at least one of its **Generation Sets** to start up from shutdown without connections to external power supplies. Such **Power Stations** are to be referred to as **Black Start Stations**.

**DOC9.4.1.4** For each **Black Start Station** plans will be put in place, in accordance with the **Grid Code**, which in the event of a **Partial Shutdown** or **Total Shutdown**, will provide for the establishment of a **Power Island**. These plans are known as Local Joint Restoration Plans produced jointly by NGC the DNO and Generators and may include **Embedded Generators**. DNOs will be party to these Plans irrespective of whether the **Black Start Station** is **Embedded**.

**DOC9.4.1.5** In Scotland a Local Joint Restoration Plan may include more than one **Black Start Station** and may be produced with and include obligations on the relevant **Transmission Licensee**, Generators responsible for **Generation Sets** not at a **Black Start Station** and other Users.

**DOC9.4.2 Black Start Situation**

In the event of a **Total Shutdown** or **Partial Shutdown**, the DNO will, as soon as reasonably practicable, inform Users which, in the DNO’s opinion, need to be informed that a **Total Shutdown** or, as the case may be, a **Partial Shutdown**, exists and that NGC intends to implement the **Black Start** procedure.

In Scotland, in exceptional circumstances, as specified in the Local Joint Restoration Plan, the relevant **Transmission Licensee** may invoke such Local Joint Restoration Plan for its own **Transmission System** and operate within its provisions.

**DOC9.4.3 Black Start Recovery Procedure**
The procedure necessary for a recovery from a Total Shutdown or Partial Shutdown is known as Black Start, the main objective of which is the restoration of the Total System as an integrated whole as soon as possible bearing in mind the restoration of Customers. The procedure for a Partial Shutdown is the same as that for a Total Shutdown except that it applies only to a part of the Total System. It should be remembered that a Partial Shutdown may affect parts of the Total System which are not themselves shut down.

The complexities and uncertainties of recovery from a Total Shutdown or Partial Shutdown require that Black Start is sufficiently flexible in order to accommodate the full range of Generation Set and Total System characteristics and operational possibilities and this precludes the setting out of concise chronological sequences. The overall strategy will in general include the overlapping phases of establishment of isolated groups of Power Stations together with complementary local Demand termed “Power Islands”, step by step integration of these groups into larger sub-systems and eventually re-establishment of a complete Total System.

Where there are no Power Stations with a contracted Black Start capability within the DNO's Distribution System, then restoration of supply may be substantially delayed while the relevant Transmission Licensee re-establishes the National Electricity Transmission System or part of the National Electricity Transmission System from a restored Power Island. The DNO shall re-appraise the priorities in these situations and restore supplies in accordance with such priorities.

The procedure for a Black Start shall, therefore, be that specified by the relevant Transmission Licensee at the time. Users shall abide by the DNO’s instructions during a Black Start situation, even if they conflict with the general overall strategy outlined in DOC9.4.3.2.

The DNO may, in accordance with the relevant Transmission Licensee’s requirements, be required to issue instructions (although this list should not be regarded as exhaustive) to a Black Start Station relating to the commencement of generation, to a User connected to the DNO’s Distribution System or Customers in the DNO's authorised operating area, as appropriate, relating to the restoration of Demand and to an Embedded Power Station relating to their preparation for commencement of generation when an external power supply is made available to them, and in each case may include switching instructions.

Where the DNO, as part of the Black Start procedure, has given an instruction to a Black Start Station to initiate startup the Black Start Station shall confirm to the DNO when the startup of a Generation Set has been completed. Following confirmation of startup, the DNO will endeavour to stabilise that Generation Set by the establishment of appropriate Demand following which the DNO may instruct the Black Start Station to start up the remaining available Generation Sets and auxiliary gas turbines if any at that Black Start Station and synchronise them to create a Power Island.
DISTRIBUTION OPERATING CODE (DOC)

DOC9.4.3.7 Interconnection of Power Islands

In accordance with the requirements of the relevant Transmission Licensee, the DNO may be required to issue instructions to Users so as to establish, maintain and expand Power Islands and to interconnect Power Islands to achieve larger sub-systems and subsequently to form an integrated System and re-establishment of the Total System. Users shall at all times abide by the DNO's instructions in relation to interconnection of Power Islands.

DOC9.4.3.8 The conclusion of the Black Start situation and the time of the normal operation of the Total System will be determined by the relevant Transmission Licensee who shall inform the DNO. The DNO will inform Users of the DNO’s Distribution System which in the DNO’s opinion need to be informed that the Black Start situation no longer exists and that normal operation of the Total System has begun.

DOC9.5 Re-synchronisation of De-synchronised Islands

DOC9.5.1 Where parts of the Total System are out of synchronism with each other but there is no Total Shutdown or Partial Shutdown NGC will instruct Users to regulate generation or Demand, as the case may be, to enable the de-synchronised islands to be re-synchronised.

DOC9.5.2 DNOs may be involved in re-synchronising by issuing instructions to Users in accordance with the requirements of NGC. Users shall at all times abide by the DNO’s instructions in relation to re-synchronising de-synchronised islands.

DOC9.5.3 The re-synchronising of de-synchronised islands are covered by De-synchronised Island Procedures agreed between NGC and the relevant Transmission Licensee, DNO and Generators.

DOC9.6 Joint System Incident Procedure

DOC9.6.1 A Joint System Incident is an Event (as referred to in Distribution Operating Code DOC7) wherever occurring which in the opinion of the DNO has or may have a serious and/or widespread effect on, in the case of an incident on a User’s System, the DNO’s Distribution System or the National Electricity Transmission System or, in the case of an incident on the DNO’s Distribution System or the National Electricity Transmission System, on a User’s, or Users’, System(s). Where an incident on a User’s System has or may have no effect on the DNO’s Distribution System or the National Electricity Transmission System, then such an incident does not fall within this Distribution Operating Code and accordingly DOC9 shall not apply to it.

DOC9.6.2 Each User requested by the DNO in accordance with the Distribution Planning and Connection Code, shall provide in writing to the DNO and the DNO shall provide in writing to each such User a telephone number or numbers at which or through which responsible management representatives, who are fully authorised to take binding decisions on behalf of their appointers, can be contacted day or night when there is a Joint System Incident. The lists of telephone numbers shall be provided at the time that a User connects to the DNO’s Distribution System and must be updated (in writing) as often as the information contained in them changes.
**DISTRIBUTION OPERATING CODE (DOC)**

**DOC9.6.3** On the occurrence of an **Event**, then pursuant to **Distribution Operating Code DOC7**:

(a) If it is on the **System** of a **User**, the **User** shall notify the **DNO** accordingly together with any other **User** who is or may be affected and will inform the **DNO** of which **Users** it has informed.

(b) If it is on the **DNO's Distribution System**, the **DNO** shall notify all **Users** who are or may be affected.

**DOC9.6.4** Following notification by a **User** of an **Event**, the **DNO** will if it considers necessary, telephone the **User** on the telephone number referred to in **DOC9.6.2** to obtain such additional information as it requires.

**DOC9.6.5** Following notification of an **Event** in accordance with **DOC9.6.3(a)** or **(b)**, and/or the receipt of any additional information requested pursuant to **DOC9.6.4**, the **DNO** will determine whether or not the **Event** is a **Joint System Incident**, and, if so, the **DNO** may set up a **System Incident Centre** in order to avoid overloading existing operational arrangements of the **DNO**.

**DOC9.6.6** The **DNO** shall as soon as possible notify all relevant **Users** that a **System Incident Centre** has been established and the telephone number(s) of the **DNO’s System Incident Centre** if different from those already supplied pursuant to **DOC9.6.2**.

**DOC9.6.7** All communications between the responsible management representatives of the relevant parties with regard to the **DNO’s role in the Joint System Incident** shall be made via the **System Incident Centre**, if it has been established.

**DOC9.7** **Civil Emergencies**

**DOC9.7.1** Directions under Section 96 of the **Act** place an obligation on the **DNO** to prepare and maintain plans for mitigating the effects of any civil emergency which may occur in accordance with the Electricity Supply Emergency Code. That Code describes the steps which Government might take to deal with an electricity supply emergency envisaged under Section 96(7) of the **Act** or Section 3(i)(b) of the Energy Act 1976 and sets down the actions which Companies in the Electricity Supply Industry should plan to take and which may be needed or required in order to deal with such an emergency.

**DOC9.7.2** In an electricity emergency it may become necessary to restrict **Users’ Demand** for and consumption of electricity and may be achieved by one or more of the following methods:

(a) Appeals by the Government to the public for voluntary restraint.

(b) The issue of Orders under the Energy Act 1976 requiring restrictions on consumption by industry and commerce.

(c) The issue of directions under the Energy Act 1976 requiring rota disconnections and associated restrictions.
DOC9.7.3 In the event that the Secretary of State issues directions to the DNO to implement rota disconnections, the DNO will establish an Emergency Co-ordinating Centre and as soon as possible establish communications with such relevant Users as is necessary to ensure operational liaison. The plans to be implemented will be similar or separate from the schemes outlined in Distribution Operating Code, DOC6.

DOC9.7.4 The plans make provision for the need to maintain supply, so far as practicable, to consumers in protected categories. For the purpose of the Distribution Code Nuclear Generating Plant shall be deemed to be a protected category in accordance with the provisions of DOC6.1.4.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 10

DOC10 OPERATIONAL EVENT REPORTING AND INFORMATION SUPPLY

DOC10.1 Introduction

DOC10.1.1 This Distribution Operating Code DOC10 sets out the requirements for reporting in writing and, where appropriate, more fully those Events termed Significant Incidents which were initially reported under Distribution Operating Code DOC7 and those statutory specified events to be reported under the ESQCR.

Information between a DNO and Users will be exchanged on the reasonable request of either party.

DOC10.1.2 DOC10 also provides for the joint investigation of Significant Incidents by the Users involved.

DOC10.2 Objectives

The objective of this Distribution Operating Code is to facilitate the provision of more detailed information in writing and, where agreed between the DNO and the Users involved, joint investigation of those Significant Incidents initially reported under DOC7.

DOC10.3 Scope

This Distribution Operating Code DOC10 applies to the DNO and to Users, which in this Distribution Operating Code means:-

(a) High Voltage Customers.
(b) Embedded Generators connected to the DNO’s Distribution System at HV.
(c) Other Authorised Distributors connected to the DNO’s Distribution System at HV.
(d) Suppliers on behalf of their Customers where appropriate.

DOC10.4 Communications

DOC10.4.1. The DNO and Users connected to the DNO’s Distribution System shall establish communication channels to ensure the effectiveness of this Distribution Operating Code. Communication should, as far as possible, be direct between the User and the operator of the network to which that User is connected. However, this does not preclude communication with the User’s nominated representative.
DISTRIBUTION OPERATING CODE (DOC)

DOC10.4.2 Operational Event Reporting

DOC10.4.2.1 Written Reports of Events by Users to the DNO

In the case of an Event which has been reported initially to the DNO under DOC7.6 and subsequently has been determined by the DNO to be a Significant Incident, a written report will be given to the DNO by the User in accordance with DOC10. The DNO will not pass this report on to other affected Users but may use the information contained therein in preparing a report under DOC10 to a User in relation to a Significant Incident on the DNO’s Distribution System which has been caused by (or exacerbated by) the Significant Incident on the User’s System.

DOC10.4.2.2 Written Reports of Events by the DNO to Users

In the case of an Event which has been reported initially to the User under DOC7.6 and subsequently has been determined by the User to be a Significant Incident, a written report will be given to the User by the DNO in accordance with DOC10. The User will not pass this report on to other affected Users but may use the information contained therein in preparing a report for another Authorised Electricity Operator connected to its System in relation to a Significant Incident which has been caused by (or exacerbated) the Significant Incident on the DNO’s Distribution System.

DOC10.4.3 Form of Report in Writing

DOC10.4.3.1 A report under DOC10.4.2 will be in writing and shall be sent to the DNO or User, as the case may be, containing written confirmation of the initial notification given under DOC7 together with more details relating to the Significant Incident, although it need not state the cause of the Event save to the extent required under DOC7.6.2 and such further information which has become known relating to the Significant Incident since the initial notification under DOC7. The report should, as a minimum, contain those matters specified in the Appendix 1 of this DOC10 which is not intended to be exhaustive to this DOC10. The recipient may raise questions to clarify the notification, and the giver of the notification will, in so far as it is able, answer any questions raised.

DOC10.4.4 Timing of the Report in Writing

DOC10.4.4.1 A written report under DOC10.4.2 shall be given as soon as reasonably practicable after the initial notification under DOC7 and in any event a preliminary report shall normally be given within 24 hours of such time.

DOC10.4.5 Statutory Reports of Specified Events

DOC10.4.5.1 Nothing in this Distribution Operating Code shall be construed as relieving DNOs or Users from their duty to report events specified in the ESQCR in accordance with those Regulations in so far as they apply to Users.

DOC10.4.6 Joint Investigation into Significant Incidents

DOC10.4.6.1 Where a Significant Incident has been declared and a report submitted under DOC10 either party or parties may request in writing that a joint investigation be carried out.
DOC10.4.6.2 The composition of such an investigation panel will be appropriate to the
incident to be investigated, and agreed by all parties involved.

DOC10.4.6.3 Where there has been a series of Significant Incidents (that is to say, where a
Significant Incident has caused or exacerbated another Significant Incident)
the parties involved may agree that the joint investigation should include
some or all of those Significant Incidents.

DOC10.4.6.4 A joint investigation will only take place where all affected parties agree to it.
The form and rules of, the procedure for, and all matters (including, if thought
appropriate, provisions for costs and for a party to withdraw from the joint
investigations once it has begun) relating to the joint investigation will be
agreed at the time of a joint investigation and in the absence of agreement the
joint investigation will not take place.

DOC10.4.6.5 Any joint investigation under DOC10 is separate from any inquiry which may
be carried out under the Electricity Supply Industry (ESI) disputes
resolution procedure.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 10

DOC 10 - APPENDIX 1

MATTERS, IF APPLICABLE TO THE SIGNIFICANT INCIDENT, TO BE INCLUDED IN A WRITTEN REPORT GIVEN IN ACCORDANCE WITH DOC10.4.2.

1. Time and date of Significant Incident.
2. Location.
3. Plant and/or Apparatus involved.
4. Brief description of Significant Incident.
5. Estimated time and date of return to service.
7. Set/Station frequency response achieved.
8. Set/Station MVAr performance achieved.
9. Ownership of the faulted Plant and/or Apparatus.
10. Estimated Demand Control relief undertaken.
12. Time and date of Demand restoration.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 11

DOC11 NUMBERING AND NOMENCLATURE OF ELECTRICAL APPARATUS AT OWNERSHIP BOUNDARIES

DOC11.1 Introduction

DOC11.1.1 This Distribution Operating Code DOC11 sets out the responsibilities and procedures for notifying the relevant owners of the numbering and nomenclature of Apparatus at Ownership Boundaries.

DOC11.1.2 The numbering and nomenclature of Apparatus shall be included in the Operation Diagram prepared for each site having an Ownership Boundary.

DOC11.2 Objectives

The prime objective embodied in this Distribution Operating Code is to ensure that at any site where there is an Ownership Boundary every item of Apparatus has numbering and/or nomenclature that has been mutually agreed and notified between the owners concerned to ensure, so far as is reasonably practicable the safe and effective Operation of the Systems involved and to reduce the risk of error.

DOC11.3 Scope

This Distribution Operating Code DOC11 applies to the DNO and to Users, which in this Distribution Operating Code excludes Users connected at Low Voltage without Generation and protected by a fuse(s) or other device(s) rated at 100 amps or less, (except it may apply to such Users who are the sole User connected to an HV/LV transformer.), and otherwise includes:

(a) Customers.
(b) Embedded Generators, but excluding the OTSO.
(c) Other Authorised Distributors connected to the DNO’s Distribution System.
(d) Meter Operators.

DOC11.4 Procedure

DOC11.4.1 New Apparatus

DOC11.4.1.1 When the DNO or a User intends to install Apparatus having an interface at an Ownership Boundary the proposed numbering and/or nomenclature to be adopted for the Apparatus must be notified to the other owner(s).

DOC11.4.1.2 The notification shall be made in writing to the relevant owner(s) and will consist of Operation Diagrams incorporating the proposed new Apparatus to be installed and its proposed numbering and/or nomenclature.

DOC11.4.1.3 The notification shall be made to the relevant owner(s) at least eight months prior to the proposed installation of the Apparatus.
DOC11.4.1.4 The relevant owners shall respond in writing within one month of the receipt of the notification confirming both receipt and whether the proposed numbering and/or nomenclature is acceptable or, if not, what would be acceptable.

DOC11.4.1.5 In the event that agreement cannot be reached between the DNO, and the other owner(s), the DNO, acting reasonably, shall have the right to determine the numbering and nomenclature to be applied at that site.

DOC11.4.2 Existing Apparatus

DOC11.4.2.1 The DNO and/or every User shall supply the DNO and/or every other User on request with details of the numbering and nomenclature of Apparatus on sites having an Ownership Boundary.

DOC11.4.2.2 The DNO and every User shall be responsible for the provision and erection of clear and unambiguous labelling showing the numbering and nomenclature of its Apparatus on sites having an Ownership Boundary.

DOC11.4.3 Changes to Existing Apparatus

DOC11.4.3.1 Where the DNO or a User needs or wishes to change the existing numbering and/or nomenclature of any of its Apparatus on any site having Ownership Boundary, the provisions of DOC11.4.1 shall apply with any amendments necessary to reflect that only a change is being made.

DOC11.4.3.2 Where a User changes the numbering and/or nomenclature of its Apparatus, which is the subject of DOC11, the User will be responsible for the provision and erection of clear and unambiguous labelling.

DOC11.4.3.3 Where a DNO changes the numbering and/or nomenclature of its Apparatus, which is the subject of DOC11, the DNO will be responsible for the provision and erection of clear and unambiguous labelling.
DISTRIBUTION OPERATING CODE (DOC)

DISTRIBUTION OPERATING CODE 12

DOC12 SYSTEM TEST

DOC12.1 Introduction

DOC12.1.1 This Distribution Operating Code DOC12 sets out the responsibilities and procedures for arranging and carrying out System Test which have or may have an effect on the Systems of the DNO or Users. System Test are those tests which involve either simulating conditions or the controlled application of irregular, unusual or extreme conditions on the Total System or any part of the Total System, but do not include commissioning or recommissioning tests or any other tests of a minor nature.

DOC12.1.2 System Test which have a minimal effect on the Distribution System of the DNO or the Systems of others will not be subject to this procedure; minimal effect will be taken to mean variations in voltage, Frequency and waveform distortion of a value not greater than those figures which are defined in the Distribution Planning and Connection Code.

DOC12.1.3 If the System Test proposed by the DNO or User connected to the DNO’s Distribution System will or may have an effect on the National Electricity Transmission System then the provisions of the Grid Code shall apply.

DOC12.1.4 A System Test proposed by NGC under the Grid Code will be treated by the DNO as a System Test under this DOC 12 if it is considered by the DNO to have any effect on Users as defined in DOC 12.3.1.

DOC12.2 Objectives

DOC12.2.1 The objectives of this Distribution Operating Code are to:-

(a) Ensure that the procedures for arranging and carrying out of System Test do not so far as practicable, threaten the safety of either personnel or the general public and cause minimum threat to the security of supplies, the integrity of Plant and/or Apparatus and cause minimum detriment to the DNO and Users.

(b) Set out procedures to be followed for establishing and reporting System Test.

DOC12.3 Scope

DOC12.3.1 This Distribution Operating Code applies to the DNO and to Users, which in this Distribution Operating Code means:-

(a) High Voltage Customers.

(b) Embedded Generators connected to the DNO’s Distribution System at HV.

(c) Other Authorised Distributors connected to the DNO’s Distribution System at HV.
DOC12.4  Procedure

DOC12.4.1  Proposal Notice

DOC12.4.1.1  When the DNO or a User intends to undertake a System Test which will have or may have an effect on the System of others normally six months notice, or as otherwise agreed by the DNO, of the proposed System Test will be given by the person proposing the System Test (the “Test Proposer”) to the DNO and to those Users who may be affected by such a System Test.

DOC12.4.1.2  The proposal shall be in writing (the "Proposal Notice") and shall contain details of the nature and purpose of the proposed System Test and will indicate the extent and situation of the Plant or Apparatus involved.

DOC12.4.1.3  If in the view of the recipients the information set out in the Proposal Notice is considered insufficient by the recipients they shall as soon as is reasonably practicable contact the Test Proposer with a request in writing for further information which shall be supplied as soon as reasonably practicable. The DNO shall not be required to do anything under this Distribution Operating Code until it is satisfied with the details supplied in the Proposal Notice or pursuant to a request for further information.

DOC12.4.1.4  If the DNO wishes to undertake a System Test the DNO shall be deemed to have received a proposal of that System Test.

DOC12.4.2  Preliminary Notice and Establishment of Test Panel

DOC12.4.2.1  The DNO shall have overall co-ordination of the System Test. Using the information supplied to it under DOC12.4.1 the DNO shall determine in its reasonable estimation, which Users other than the Test Proposer may be affected by the proposed System Test.

DOC12.4.2.2  The DNO shall, with the agreement of the Users which it has identified may be affected, appoint a Test Coordinator as soon as reasonably practicable after it has received a Proposal Notice and in any event prior to the distribution of the Preliminary Notice referred to below.

(a)  Where the DNO decides that the DNO’s Distribution System will or may be significantly affected by the proposed System Test, then the Test Coordinator shall be a suitably qualified person nominated by the DNO.

(b)  Where the DNO decides that the DNO’s Distribution System will not be significantly affected by the proposed System Test, then the Test Coordinator shall be a suitably qualified person nominated by the proposer of the System Test, in consultation with the DNO.

(c)  The DNO shall as soon as reasonably practicable after it has received a Proposal Notice contact the Test Proposer where the Test Coordinator is to be (pursuant to this Distribution Operating Code) a person nominated by the Test Proposer and invite him to nominate a person.  If the Test Proposer is unable or unwilling to nominate a person within seven days of being contacted by the DNO then the proposed System Test will not take place.

DOC12.4.2.3  The DNO will notify all Users identified by it under DOC12.4.2.1 in writing of the proposed System Test which in this Distribution Operating Code shall be known as a Preliminary Notice.  The Preliminary Notice will contain:
(a) The details of the nature and purpose of the proposed System Test, the extent and situation of the Plant and/or Apparatus involved and the Users involved.

(b) An invitation to nominate within fourteen days a suitably qualified representative (or representatives if the Test Coordinator informs the DNO that it is appropriate for a particular User) to be a member of a Test Panel for the proposed System Test.

(c) The name of the DNO representative (or representatives) on the Test Panel for the proposed System Test.

(d) The name of the Test Coordinator and whether he was nominated by the proposer of the System Test or by the DNO.

DOC12.4.2.4 The Preliminary Notice shall be sent within one month of the receipt by the DNO of the Proposal Notice or the receipt of any further information requested under DOC12.4.13, whichever is the later. Where the DNO is the Test Proposer the Preliminary Notice will be sent as soon as possible after the proposed System Test has been formulated.

DOC12.4.2.5 If replies to the invitation in the Preliminary Notice to nominate a representative to be a member of the Test Panel have not been received within fourteen days, the User which has not replied shall not be entitled to be represented on the Test Panel.

DOC12.4.2.6 The DNO shall as soon as possible after the expiry of that fourteen day period appoint nominated persons to the Test Panel and notify all relevant Users - of the composition of the Test Panel.

DOC12.4.3 Test Panel

DOC12.4.3.1 A meeting of the Test Panel shall take place as soon as possible after the DNO has notified relevant Users of the composition of the Test Panel, and in any event within one month of the appointment of the Test Panel.

DOC12.4.3.2 The Test Panel shall consider:-

(a) The details of the nature and purpose of the proposed System Test and other matters set out in the Proposal Notice (together with any further information requested under DOC12.4.2).

(b) The economic, operational and risk implications of the proposed System Test.

(c) The possibility of combining the proposed System Test with any other tests and with Plant and/or Apparatus outages which arise pursuant to the Operational Planning requirements of the DNO, NGC and Users.

(d) The implications of the proposed System Test on plant which comprise or contain BM Units which are active (i.e. submitting bid-offer data) in the Balancing Mechanism insofar as it is able to do so.

DOC12.4.3.3 Users who received a Preliminary Notice concerning the proposed System Test (whether or not they are represented on the Test Panel) shall be obliged to supply that Test Panel upon written request with such details as the Test Panel reasonably requires in order to consider the proposed System Test.
DISTRIBUTION OPERATING CODE (DOC)

DOC12.4.3.4 The Test Panel will meet as often as the Test Co-ordinator deems necessary to conduct its business and he shall be the person to convene a meeting.

DOC12.4.4 Proposal Report

(a) DOC12.4.4.1 Within two months of the first meeting, the Test Panel shall submit a report, which in this Distribution Operating Code shall be called a Proposal Report, which shall contain: System Test (including the manner in which the System Test is to be monitored).

(b) An allocation of costs (including unanticipated costs) between the affected parties, (the general principle being that the Test Proposer will bear the costs).

(c) Such other matters as the Test Panel consider appropriate.

The Proposal Report may include requirements for indemnities to be given in respect of claims and losses arising from the System Test. All System Test procedures must comply with all applicable legislation.

DOC12.4.4.2 If the Test Panel is unable unanimously to agree on any decision in preparing its Proposal Report the proposed System Test shall not take place and the Test Panel will be dissolved.

DOC12.4.4.3 The Proposal Report will be submitted to the DNO and to each User who received a Preliminary Notice under DOC12.4.2.

DOC12.4.4.4 Within fourteen days of receipt of the Proposal Report, each recipient shall respond to the Test Coordinator with its approval of the Proposal Report or its reason for non-approval.

DOC12.4.4.5 In the event of non-approval by one or more recipients, the Test Panel shall as soon as practicable meet in order to determine whether the proposed System Test can be modified to meet the objection or objections.

DOC12.4.4.6 If the proposed System Test cannot be so modified, then the System Test will not take place.

DOC12.4.4.7 If the proposed System Test can be so modified, the Test Panel shall as soon as practicable, and in any event within one month of meeting to discuss the responses to the Proposal Report, submit a revised Proposal Report and the provisions of DOC12.4.4.3 and DOC12.4.4.4 will apply to that submission.

DOC12.4.4.8 In the event of non-approval of the revised Proposal Report by one or more recipients, the System Test will not take place and the Test Panel will be dissolved.
DOC12.4.5 Final Test Programme

DOC12.4.5.1 If the Proposal Report (or, as the case may be, the revised Proposal Report) is approved by all recipients, the proposed System Test can proceed and at least one month prior to the date of the proposed System Test, the Test Panel shall submit to the DNO and all recipients of the Proposal Notice a programme which in this Distribution Operating Code shall be called a “Final Test Programme” stating the switching sequence and proposed timings, a list of those staff involved in the carrying out of the System Test (including those responsible for site safety) and such other matters as the Test Panel deem appropriate.

DOC12.4.5.2 The Final Test Programme shall bind all recipients to act in accordance with the provisions contained within the programme in relation to the proposed System Test.

DOC12.4.5.3 Any problems with the proposed System Test which arise or are anticipated after the issue of the Final Test Programme and prior to the day of the proposed System Test must be notified to the Test Coordinator as soon as possible in writing. If the Test Coordinator decides that these anticipated problems merit an amendment to or postponement of the System Test, he shall notify any party involved in the proposed System Test accordingly.

DOC12.4.5.4 If on the day of the proposed System Test operating conditions on the System are such that any party involved in the proposed System Test wishes to delay or cancel the start or continuance of the System Test, they shall immediately inform the Test Coordinator of this decision and the reasons for it. The Test Coordinator shall then postpone or cancel, as the case may be, the System Test and shall if possible, agree with all parties involved in the proposed System Test another suitable time and date or if he cannot reach such agreement, shall reconvene the Test Panel as soon as practicable which will endeavour to arrange another suitable time and date and the relevant provisions of the Distribution Operating Code shall apply.

DOC12.4.6 Final Report

DOC12.4.6.1 At the conclusion of the System Test, the Test Proposer shall be responsible for preparing a written report (the “Final Report”) of the System Test for submission to the DNO and other members of the Test Panel.

DOC12.4.6.2 The Final Report shall include a description of the Plant and/or Apparatus tested and of the System Test carried out, together with the results, conclusions and recommendations for submission to other members of the Test Panel.

DOC12.4.6.3 The Final Report shall not be distributed to any party which is not represented on the Test Panel unless the Test Panel, having considered the confidentiality issues, shall have unanimously approved such distribution.

DOC12.4.6.4 When the Final Report has been submitted under DOC12.4.2.1 the Test Panel shall be dissolved.
DISTRIBUTION DATA REGISTRATION CODE (DDRC)
DDRC1 INTRODUCTION

DDRC1.1 The various sections of the Distribution Code require the DNO and Users to exchange and update data from time to time. The data which is specified in each section of the Distribution Code is summarised in the Distribution Data Registration Code (DDRC).

DDRC1.2 The Distribution Data Registration Code ("DDRC") provides a series of schedules summarising all requirements for information of a particular type. Each class of User is then referred to the appropriate schedule or group of schedules for a statement of the total data requirements in his case.

DDRC1.3 The DDRC specifies procedures and timings for the supply of data and subsequent updating, where the timings are covered by detailed timetables laid down in other sections of the Distribution Code they are not necessarily repeated in full in the DDRC.

DDRC1.4 In the case of an Embedded Generator seeking a connection to the DNO’s Distribution System then irrespective of its potential involvement in the Balancing Mechanism, discussions on connection will be with the DNO concerned with the connection arrangements, in addition to any discussions required with NGC under the Grid Code. References to “Embedded Generator” in the DDRC shall include existing and prospective Embedded Generators.

DDRC2 OBJECTIVE

The objective of the DDRC is to collate and list in a readily identifiable form all the data to be provided by:

(a) Each category of User to the DNO under the Distribution Code.
(b) The DNO to each category of User under the Distribution Code.

DDRC3 SCOPE

The DDRC will apply to the DNO and to all Users which for the purpose of the DDRC are listed below:

(a) Customers It is not intended that the Distribution Code shall generally apply to small Customers individually; their obligations will be dealt with on their behalf by their Supplier.
(b) Embedded Generators.
(c) Other Authorised Distributors connected to the DNO’s Distribution System.
(d) Suppliers
(e) Any other person who is making application for use of or connection to the DNO’s Distribution System.
DDRC4 DATA CATEGORIES

DDRC4.1 Categories of Data

Within the DDRC the data required by the DNO is allocated to one of the following three categories:

(a) **Standard Planning Data (SPD)**
(b) **Detailed Planning Data (DPD)**
(c) **Operational Data (OD)**

DDRC4.2 Standard Planning Data (SPD)

DDRC4.2.1 **Standard Planning Data** is that data listed in the *Distribution Planning and Connection Code* which is required to be supplied by all Users when making application for connection to and/or use of the DNO’s Distribution System in order that the DNO may assess the implications for making the connection.

DDRC4.2.2 **Standard Planning Data** will be provided to the DNO in accordance with Section DPC6 and DPC7 of the *Distribution Planning and Connection Code*.

DDRC4.2.3 Following an agreement for connection/use of System, it is a requirement of the *Distribution Planning and Connection Code* that estimated data supplied by Users should be replaced by actual values prior to connection which will be referred to as Registered Data.

DDRC4.3 Detailed Planning Data (DPD)

DDRC4.3.1 **Detailed Planning Data** is that data listed in the *Distribution Planning and Connection Code* which is required to be supplied by the Users specified for connection to and/or use of the DNO’s Distribution System.

DDRC4.3.2 **Detailed Planning Data** will be provided to the DNO in accordance with Section DPC6 and DPC7 of the *Distribution Planning and Connection Code*.

DDRC4.3.3 Following an agreement for connection/use of System, it is a requirement of the *Distribution Planning and Connection Code* that estimated data supplied by Users should be replaced by measured values prior to connection.

DDRC4.4 Operational Data (OD)

DDRC4.4.1 **Operational Data** is data, which is required by the *Distribution Operating Codes*.

DDRC4.4.2 **Operational Data** is required to be supplied in accordance with timetables set down in the relevant *Distribution Operating Codes* and is repeated in tabular form in the schedules attached to this DDRC.
DDRC5 PROCEDURES AND RESPONSIBILITIES

DDRC5.1 Responsibility for Submission and Updating of Data

In accordance with the provisions of the various sections of the Distribution Code and unless otherwise agreed or specified by the DNO, each User is required to submit data as defined in DDRC6 following and the attached schedules.

DDRC5.2 Methods of Submitting Data

DDRC5.2.1 Data must be submitted to the DNO in writing and where possible in the format specified by the DNO and must indicate the name of the person who is submitting those schedules.

DDRC5.2.2 If a User wishes to change any data item then this must first be discussed with the DNO concerned in order for the implications to be considered and the change if agreed (such agreement not to be unreasonably withheld), should be confirmed by the submission of a revised data scheduler by verbal means with confirmation in writing if short timescales are involved.

DDRC5.2.3 The DNO will supply data as requested by Users and as agreed by the DNO where no obligation of confidentiality exists.

DDRC5.3 Changes to User’s Data

Whenever a User becomes aware of a change to an item of data, which is registered with the DNO the User, must notify the DNO in accordance with the appropriate section of the Distribution Code. The method and timing of the notification to the DNO is set out in the appropriate section of the Distribution Code.

DDRC5.4 Data Accuracy and Data not Supplied

DDRC5.4.1 The User is solely responsible for the accuracy of data (or of changes to data) supplied to the DNO.

DDRC5.4.2 Any data which the User fails to supply when required by any section of the Distribution Code may be estimated by the DNO if and when, in the DNO’s view, it is necessary to do so. Such estimates will be based upon data supplied previously for the same Plant or Apparatus or upon corresponding data for similar Plant or Apparatus or upon such other information as the DNO deems appropriate.

DDRC5.4.3 The DNO will advise a User in writing of any estimated data it intends to use pursuant to DDRC5.4.2 relating directly to that User’s Plant or Apparatus in the event of data not being supplied. The DNO will not be liable as a result of using that estimated data; the responsibility for the accuracy of that data will rest with the User as if the data has been supplied by that User.

DDRC5.4.4 It is a requirement of the Distribution Planning and Connection Code that Registered Project Planning Data is updated by the User annually.
DDRC6 DATA TO BE REGISTERED

DDRC6.1 Schedules 1-4 are not used within the Distribution Code.

DDRC6.2 Schedules 5a, 5b and 5c - Embedded Generating Plant Technical Information.

DDRC6.3 Schedule 5e - Embedded Transmission System

DDRC6.4 Schedule 6 - Demand forecasts - as described in DOC1, time varying output/generation forecasts for the Users defined in the scope.

DDRC6.5 Schedule 7 - Operational Planning - as described in DOC2, outage planning information.

DDRC6.6 Schedule 8 - System Design Information - comprising System technical data.

DDRC6.7 Schedule 9 - Load Characteristics - comprising the forecast data for load points indicating for example, the maximum load, the equipment that comprises the load, and the harmonic content of the load.

DDRC6.8 The schedules applicable to each class of User are as follows:-

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<th>Title</th>
<th>Applicable to:</th>
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<td>Power Station Data</td>
<td>All Power Stations</td>
</tr>
<tr>
<td>Schedule 5b</td>
<td>Generation Set Data</td>
<td>All Embedded Generation Sets</td>
</tr>
</tbody>
</table>
| Schedule 5c      | Generation Set Data                  | For specified types of Generation Set and ancillary Plant and Apparatus  
(i) Synchronous Generation Set  
(ii) Fixed speed induction Generation Set  
(iii) Doubly fed induction Generation Set  
(iv) Series Converter Connected Generation Set  
(v) Transformers |
<p>| Schedule 5d      | DNO Network Data                     | DNO's Distribution System                        |
| Schedule 5e      | All Embedded Transmission System     | All Embedded Transmission System                  |
| Schedule 6       | Demand Forecasts                     | All Embedded Generators greater than 1MW; Any Other Authorised Distributor connected to the host DNO System; All Suppliers; All Customers connected at HV whose Demand is greater than 5MW |</p>
<table>
<thead>
<tr>
<th>Schedule Number:</th>
<th>Title</th>
<th>Applicable to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedule 7a</td>
<td><strong>Operational Planning</strong></td>
<td>All <em>Embedded Generators</em> greater than 1MW; Any <em>Other Authorised Distributor</em> connected to the host DNO System; All <em>Suppliers</em>; All <em>Customers</em> connected at HV whose <em>Demand</em> is greater than 5MW</td>
</tr>
<tr>
<td>Schedule 8</td>
<td><strong>System Design Information and Load Characteristics</strong></td>
<td><em>Embedded Generators</em>; Any <em>Other Authorised Distributor</em> connected to the host DNO’s <em>Distribution System</em>; All <em>Suppliers</em>; All <em>Customers</em></td>
</tr>
<tr>
<td>Schedule 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Schedule 5a

DATA REGISTRATION CODE

POWER STATION DATA FOR ALL EMBEDDED POWER STATIONS EXCLUDING THE OTSO

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a Power Station Data</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### APPLICANT’S DETAILS

#### Customer’s Details

- **Company name**: Text
- **Company registered number**: Text
- **Postal address**: Text
- **Contact name**: Text
- **Email address**: Text
- **Telephone number**: Text
- **Facsimile number**: Text

#### Consultant’s Details (if applicable)

- **Consultant’s name**: Text
- **Postal address**: Text
- **Contact name**: Text
- **Email address**: Text
- **Telephone number**: Text
- **Facsimile number**: Text

### POWER STATION LOCATION AND OPERATION

- **Power Station name**: Text
- **Details of any existing Connection Agreements for this Power Station**: Text
- **Target date for the provision of the connection / commissioning of the Power Station**: Text
- **Postal address or site boundary plan (1/500)**: Text / Plan
- **Connection Point (OS grid reference or description)**: Text
- **Connection Point voltage**: V
- **Single line diagram of any on-site existing or proposed electrical plant or, where available, Operation Diagrams**: Diagram
- **What security is required for the connection? (see note 1)**: Text
- **Number of Generation Sets in Power Station**: Number
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5a Power Station Data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are all <em>Generation Sets</em> of the same design/rating? (If not complete the relevant Schedules 5b and 5c for each type)</td>
<td>Y/N</td>
<td>SPD</td>
</tr>
<tr>
<td>Will the <strong>Power Station</strong> operate in islanded mode?</td>
<td>Y/N</td>
<td>SPD</td>
</tr>
<tr>
<td>Will <strong>Generating Plant</strong> supply electricity to on-site premises?</td>
<td>Y/N</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>POWER STATION STANDBY IMPORT REQUIREMENTS (see note 2)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum <strong>Active Power</strong> import</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> import (lagging)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> export (leading)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>POWER STATION TOP-UP IMPORT REQUIREMENTS (see note 3)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum <strong>Active Power</strong> import</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> import (lagging)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> export (leading)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>POWER STATION EXPORT REQUIREMENTS (see note 4)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total <strong>Power Station</strong> output at <strong>Registered Capacity</strong> (net of auxiliary loads)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Registered Capacity</strong> (maximum <strong>Active Power</strong> export)</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> export (lagging)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> import (leading)</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Total <strong>Power Station</strong> output at <strong>Minimum Generation</strong> (net of auxiliary loads)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Generation</strong> (minimum <strong>Active Power</strong> export)</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> export (lagging)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td>Maximum <strong>Reactive Power</strong> import (leading)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Power Station</strong> performance chart (net, at <strong>Connection Point</strong>, as per DPC7 Figure 1)</td>
<td>Figure</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>POWER STATION MAXIMUM FAULT CURRENT CONTRIBUTION (see note 5)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak asymmetrical short circuit current at 10ms ($i_p$) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>RMS value of the initial symmetrical short circuit current ($I_{ik}”) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
<td>SPD</td>
</tr>
</tbody>
</table>
### DATA DESCRIPTION

#### 5a Power Station Data

<table>
<thead>
<tr>
<th><strong>DESCRIPTION</strong></th>
<th><strong>UNITS</strong></th>
<th><strong>DATA CATEGORY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short circuit time constant $T''$, corresponding to the change from $I_k''$ to $I_k(100)$</td>
<td>s</td>
<td>DPD</td>
</tr>
<tr>
<td>Positive sequence X/R ratio at the instant of fault</td>
<td>-</td>
<td>DPD</td>
</tr>
</tbody>
</table>

#### POWER STATION INTERFACE ARRANGEMENTS (see note 6)

<table>
<thead>
<tr>
<th><strong>Measures of connection, disconnection and synchronising between DNO and User</strong></th>
<th><strong>Method statement</strong></th>
<th><strong>DATA CATEGORY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site protection / co-ordination arrangements with DNO</td>
<td>Report</td>
<td>DPD</td>
</tr>
<tr>
<td>Precautions should neutral become disconnected from earth (LV only see ER G59/3)</td>
<td>Report</td>
<td>DPD</td>
</tr>
<tr>
<td>Site communications, control and monitoring (HV / LV)</td>
<td>Report</td>
<td>DPD</td>
</tr>
</tbody>
</table>

### Notes:

1. The DNO will assume a single circuit connection to the **Power Station** is required unless stated otherwise. Options include:-
   a. Single circuit connection
   b. Manually switched alternative connection
   c. Automatic switched alternative connection
   d. Firm connection (secure for first circuit outage)

2. This section relates to operating conditions when the **Power Station** is importing **Active Power**, typically when it is not generating. The maximum **Active Power** import requirement and the associated maximum **Reactive Power** import and/or export requirements should be stated.

3. This section relates to operating conditions when the **Power Station** is importing **Active Power**, typically when it is generating, but is not generating sufficient power to cater for all the on-site demand. The maximum **Active Power** import requirement and the associated maximum **Reactive Power** import and/or export requirements should be stated.

4. This section relates to operating conditions when the **Power Station** is exporting **Active Power**. The **Active Power** export and associated maximum **Reactive Power** range should be stated for operation at **Registered Capacity** and for operation at **Minimum Generation**.

5. See ER G74, ETR 120 and IEC 60909 for guidance on fault current data. Additionally, fault current contribution data may be provided in the form of detailed graphs, waveforms and/or tables. This information need not be provided where detailed fault level contribution / impedance data is provided for each **Generation Set** in Schedules 5b or 5c.

6. The interface arrangements need to be agreed and implemented between the **User** and the DNO before energisation and consideration should be given to addressing the Distribution Code requirements including DGC5, DGC8, DPC6.7, DPC7.2.6, DOC5, DOC7.4, DOC8.6.3, DOC8.6.4, DOC9 and DOC10. For example DOC7 requires that up to date contact details are provided and procedures are agreed to establish an effective means of communication between the **Generator** and the DNO.
Schedule 5b

DATA REGISTRATION CODE

GENERATION SET DATA FOR ALL EMBEDDED GENERATION SETS

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>Data Category for Generators Connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DATA DESCRIPTION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b Generation Set Data</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GENERATION SET GENERAL DATA**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Generation Sets to which this data applies</td>
<td>Value</td>
<td>SPD</td>
</tr>
<tr>
<td>Type of Generation Set: Synchronous Generator, Fixed Speed Induction Generator, Double Fed Induction Generator, Series Convertor Connected Generator, Other (provide details)</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Type of prime mover</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Operating regime – intermittent or non-intermittent (see note 1)</td>
<td>Text</td>
<td>SPD</td>
</tr>
</tbody>
</table>

**GENERATION SET OUTPUT DATA**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated terminal voltage (generator)</td>
<td>V</td>
<td>SPD</td>
</tr>
<tr>
<td>Rated terminal current (generator)</td>
<td>A</td>
<td>SPD</td>
</tr>
<tr>
<td>Generation Set Registered Capacity</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Generation Set apparent power rating (to be used as base for generator parameters)</td>
<td>MVA</td>
<td>SPD</td>
</tr>
<tr>
<td>Generation Set rated Active Power</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum measured Active Power $P_{60}$ (see note 2)</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td>Maximum measured Active Power $P_{0.2}$ (see note 2)</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td>Minimum Generation (set connected; net of auxiliary loads)</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td>Generation Set Reactive Power capability at rated Active Power (gross, at generator terminals)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Reactive Power export (lagging)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td>Maximum Reactive Power import (leading)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td>Generation Set performance chart (gross, at generator terminals, as per DPC7 Figure 1)</td>
<td>Figure</td>
<td>DPD</td>
</tr>
</tbody>
</table>
**DATA DESCRIPTION**

<table>
<thead>
<tr>
<th>5b Generation Set Data</th>
</tr>
</thead>
</table>

**UNITS** | **Data Category for Generators connected at LV** | **Data Category for Generators Connected at HV** |
|------------|---------------------------------|---------------------------------|

**GENERATION SET MAXIMUM FAULT CURRENT CONTRIBUTION (see note 3)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Units</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak asymmetrical short circuit current at 10ms (i_p) for a 3φ short circuit fault at the <strong>Generation Set</strong> terminals</td>
<td>kA</td>
<td>None</td>
</tr>
<tr>
<td>RMS value of the initial symmetrical short circuit current (I_k'') for a 3φ short circuit fault at the <strong>Generation Set</strong> terminals</td>
<td>kA</td>
<td>None</td>
</tr>
<tr>
<td>RMS value of the symmetrical short circuit current at 100ms (I_{k(100)}) for a 3φ short circuit fault at the <strong>Generation Set</strong> terminals</td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>Short circuit time constant (T''), corresponding to the change from (I_k'') to (I_{k(100)})</td>
<td>s</td>
<td>None</td>
</tr>
<tr>
<td>Positive sequence X/R ratio at the instant of fault</td>
<td>-</td>
<td>None</td>
</tr>
</tbody>
</table>

**Notes:**

1. Intermittent and Non-intermittent Generation is defined in ER P2/6 as follows:
   - Intermittent Generation: Generation plant where the energy source for the prime mover cannot be made available on demand
   - Non-intermittent Generation: Generation plant where the energy source for the prime mover can be made available on demand

2. For wind turbines only - IEC 61400-21 (\(P_{60}\) and \(P_{0.2}\))

3. See ER G74, ETR 120 and IEC 60909 for guidance on fault current data. Additionally, fault current contribution data may be provided in the form of detailed graphs, waveforms and/or tables. This information need not be provided where detailed fault level contribution / impedance data is provided for the site in Schedule 5a or for each **Generation Set** in Schedules 5c.
## DATA DESCRIPTION

### 5c (i) Synchronous Generation Sets
(or Equivalent Synchronous Generation Sets – see note 1)

<table>
<thead>
<tr>
<th><strong>Generationset Model Data</strong></th>
<th><strong>Units</strong></th>
<th><strong>Data Category for Generators Connected at LV</strong></th>
<th><strong>Data Category for Generators Connected at HV</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation Set identifier</strong></td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>Type of Generation Set</strong> (round rotor, salient pole or asynchronous equivalent – see note 1)</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>Positive sequence (armature) resistance</strong></td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>Short circuit ratio (see note 2)</strong></td>
<td>Number</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Inertia constant (Generation Set and Prime Mover)</strong></td>
<td>MW/see/ MVA</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td><strong>Direct axis reactances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-transient (X”d) – unsaturated / saturated</td>
<td>per unit</td>
<td>SPD / SPD</td>
<td>SPD / SPD</td>
</tr>
<tr>
<td>Transient (X’d) – unsaturated / saturated</td>
<td>per unit</td>
<td>DPD / DPD</td>
<td>SPD / SPD</td>
</tr>
<tr>
<td>Synchronous (Xd) – unsaturated / saturated</td>
<td>per unit</td>
<td>DPD / DPD</td>
<td>SPD / SPD</td>
</tr>
<tr>
<td><strong>Quadrature axis reactances:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-transient (X”q) – unsaturated / saturated</td>
<td>per unit</td>
<td>None</td>
<td>DPD / DPD</td>
</tr>
<tr>
<td>Transient (X’q) – unsaturated / saturated</td>
<td>per unit</td>
<td>None</td>
<td>DPD / DPD</td>
</tr>
<tr>
<td>Synchronous (Xq) – unsaturated / saturated</td>
<td>per unit</td>
<td>None</td>
<td>DPD / DPD</td>
</tr>
<tr>
<td><strong>Time constants:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State whether time constants are open or short circuit</td>
<td>Text</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>D-axis sub-transient – unsaturated / saturated</td>
<td>s</td>
<td>DPD / DPD</td>
<td>SPD / SPD</td>
</tr>
<tr>
<td>D-axis transient – unsaturated / saturated</td>
<td>s</td>
<td>DPD / DPD</td>
<td>SPD / SPD</td>
</tr>
<tr>
<td>Q-axis sub-transient – unsaturated / saturated</td>
<td>s</td>
<td>None</td>
<td>DPD / DPD</td>
</tr>
<tr>
<td>Q-axis transient – unsaturated / saturated</td>
<td>s</td>
<td>None</td>
<td>DPD / DPD</td>
</tr>
<tr>
<td><strong>Stator leakage reactance (unsaturated)</strong></td>
<td>per unit</td>
<td>None</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Zero sequence resistance (earthed star only, including any neutral earthing resistance)</strong></td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Zero sequence reactance (earthed star only, including any neutral earthing reactance)</strong></td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Negative sequence resistance</strong></td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Negative sequence reactance</strong></td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
</tbody>
</table>
### DATA DESCRIPTION

<table>
<thead>
<tr>
<th>5c (i) Synchronous Generation Sets (or Equivalent Synchronous Generation Sets – see note 1)</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated field current</td>
<td>A</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Field current open circuit saturation curve (from 50% to 120% of rated terminal voltage)</td>
<td>Graph</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Potier reactance (if saturation factor available – see note 3)</td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Saturation factor (pu field current to produce 1.2pu terminal voltage on open circuit)</td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
</tbody>
</table>

### GENERATION SET MODELS

<table>
<thead>
<tr>
<th></th>
<th>Model</th>
<th>DPD</th>
<th>DPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governor and prime mover model (see note 4)</td>
<td>Model</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>AVR / excitation model (see note 4)</td>
<td>Model</td>
<td>DPD</td>
<td>DPD</td>
</tr>
</tbody>
</table>

### Notes:

1. Asynchronous generators may be represented here by an equivalent synchronous generator data set.

2. The short circuit ratio (SCR) of a Generation Set is one measure of the performance of a machine under short circuit conditions and is important in determining the unit’s stability performance. The reciprocal of the per unit on rating saturated synchronous reactance, Xd(sat), is equal to the SCR.

3. The Potier reactance is only required if the saturation factor is available. The saturation factor is defined as the pu value of field current required to generate 1.2pu stator terminal voltage on open circuit.

4. SPD will normally be sufficient, except where the DNO considers that the stability and security of the network is at risk. Sufficient DPD should then be provided in order to build up a suitable Generation Set dynamic model for analysis. Alternatively a ‘Black Box’ dynamic model of the Generation Set may be provided. All models should be suitable for the software analysis package used by the DNO.
### Schedule 5c (ii)

**DATA REGISTRATION CODE**

**GENERATION SET DATA FOR EMBEDDED GENERATION SETS**

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>5c (ii) Fixed Speed Induction Generation Sets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>GENERATION SET MODEL DATA</strong> (see notes 1 and 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetising reactance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Stator resistance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Stator reactance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Inner cage or running rotor resistance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Inner cage or running rotor reactance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Outer cage or standstill rotor resistance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Outer cage or standstill rotor reactance</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>State whether data is inner-outer cage or running-standstill</td>
<td>Text</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Number of pole pairs</td>
<td>number</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Gearbox ratio</td>
<td>number</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Slip at rated output</td>
<td>%</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Total effective inertia constant (generator and prime mover)</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Inertia constant of the generator rotor</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Inertia constant of the prime mover rotor</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Equivalent shaft stiffness between the two masses</td>
<td>Nm/Electrical radian</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Describe method of adding star capacitance over operating range (see notes 3 and 4)</td>
<td>Text</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>DATA DESCRIPTION</td>
<td>UNITS</td>
<td>Data Category for Generators connected at LV</td>
<td>Data Category for Generators Connected at HV</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td><strong>5c (ii) Fixed Speed Induction Generation Sets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shunt capacitance connected in parallel at % of rated output</td>
<td>SPD</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Starting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20%</td>
<td>kVA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td>or</td>
<td>Graph</td>
<td></td>
</tr>
<tr>
<td>60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Power and Reactive Power import during start-up</td>
<td>SPD</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Active Power and Reactive Power import during switching operations eg ‘6 to 4 pole’ change-over</td>
<td>DPD</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Under voltage protection setting &amp; time delay</td>
<td>SPD</td>
<td>SPD</td>
<td></td>
</tr>
<tr>
<td>Governor and prime mover model (see note 5)</td>
<td>DPD</td>
<td>DPD</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Asynchronous generators may be represented by an equivalent synchronous data set
2. The User will need to provide the above data for each asynchronous Generation Set based on the number of pole sets (ie two data sets for dual speed 4/6 pole machines).
3. LV connected generators may just have a simple fixed capacitor bank.
4. If electronic power factor control (e.g. SVC) is installed, provide details of the operating range and characteristics e.g. pf or MVAr range - operating regime: constant or voltage set-point / slope and response times.
5. SPD will normally be sufficient, except where the DNO considers that the stability and security of the network is at risk. Sufficient DPD should then be provided in order to build up a suitable Generation Set dynamic model for analysis. Alternatively a ‘Black Box’ dynamic model of the Generation Set may be provided. All models should be suitable for the software analysis package used by the DNO.
Schedule 5c (iii)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATION SETS

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>5c (iii) Doubly Fed Induction Generation Sets</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Generation Set model data (see note 2)**

<table>
<thead>
<tr>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
</table>

1. Fault current contribution data should be provided under Schedule 5b.
2. **SPD** will normally be sufficient, except where the **DNO** considers that the stability and security of the network is at risk. Sufficient **DPD** should then be provided in order to build up a suitable **Generation Set** dynamic model for analysis. Alternatively a ‘Black Box’ dynamic model of the **Generation Set** may be provided. All models should be suitable for the software analysis package used by the **DNO**.
### DATA DESCRIPTION

#### 5c (iv) Series Converter Connected Generation Sets

<table>
<thead>
<tr>
<th>Data Description</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation Set maximum fault current contribution data (see note 1)</td>
<td>Schedule</td>
<td>SPD</td>
<td>SPD</td>
</tr>
</tbody>
</table>

#### GENERATION SET MODEL DATA (see note 2)

<table>
<thead>
<tr>
<th>Data Description</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gearbox ratio</td>
<td>number</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Generator rotor speed range (minimum to rated speed)</td>
<td>rpm</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Electrical power output versus generator rotor speed</td>
<td>Graph/Table</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Total effective inertia constant (generator and prime mover)</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Inertia constant of the generator rotor at rated speed</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Inertia constant of the prime mover rotor at rated speed</td>
<td>MWsec/MVA</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Equivalent shaft stiffness between the two masses</td>
<td>Nm/Electrical radian</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>SCCG unit models including excitation, voltage/Reactive Power and prime mover control systems (see note 2)</td>
<td>Models</td>
<td>DPD</td>
<td>DPD</td>
</tr>
</tbody>
</table>

#### Notes:

1. Fault current contribution data should be provided under Schedule 5b.

2. SPD will normally be sufficient, except where the DNO considers that the stability and security of the network is at risk. Sufficient DPD should then be provided in order to build up a suitable Generation Set dynamic model for analysis. Alternatively a ‘Black Box’ dynamic model of the Generation Set may be provided. All models should be suitable for the software analysis package used by the DNO. Where required by the DNO, generator electrical parameters should be provided based on Schedule 5c (i) or 5c (ii), according to the type of machine used.
Schedule 5c (v)

DATA REGISTRATION CODE

GENERATION SET DATA FOR EMBEDDED GENERATION SETS

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>Data Category for Generators connected at LV</th>
<th>Data Category for Generators Connected at HV</th>
</tr>
</thead>
<tbody>
<tr>
<td>5c (v) Transformers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transformer identifier</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Transformer type (Unit/Station/Auxiliary)</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Number of identical units</td>
<td>Number</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Type of cooling</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Rated (apparent) power</td>
<td>MVA</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Rated voltage ratio (on principal tap)</td>
<td>kV/kV</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Positive sequence resistance on principal tap</td>
<td>per unit</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Positive sequence reactance at principal tap</td>
<td>per unit</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Positive sequence reactance at minimum tap</td>
<td>per unit</td>
<td>None</td>
<td>DPD</td>
</tr>
<tr>
<td>Positive sequence reactance at maximum tap</td>
<td>per unit</td>
<td>None</td>
<td>DPD</td>
</tr>
<tr>
<td>Zero sequence resistance</td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Zero sequence reactance</td>
<td>per unit</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Winding configuration (eg Dyn11)</td>
<td>Text</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Type of tap changer (on load / off circuit)</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Tap step size</td>
<td>%</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum ratio tap</td>
<td>%</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Minimum ratio tap</td>
<td>%</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Tap position in service (for off load tapchangers only)</td>
<td>%</td>
<td>DPD</td>
<td>DPD</td>
</tr>
<tr>
<td>Method of voltage control</td>
<td>Text</td>
<td>DPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Method of earthing of high-voltage winding</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
<tr>
<td>Method of earthing of low-voltage winding</td>
<td>Text</td>
<td>SPD</td>
<td>SPD</td>
</tr>
</tbody>
</table>
### Schedule 5d

**DATA REGISTRATION CODE**

**DNO NETWORK DATA**

(Data indicative of that which may be requested by Users for parts of the Distribution System)

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5d DNO Network Data (see note 1)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fault Level at Connection Point prior to Power Station connection.</strong></td>
<td></td>
</tr>
<tr>
<td>Peak asymmetrical short circuit current at 10ms ($i_p$) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
<tr>
<td>RMS value of the initial symmetrical short circuit current ($I_k''$) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
<tr>
<td>RMS value of the symmetrical short circuit current at 100ms ($I_{k(100)}$) for a 3φ short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
<tr>
<td>Peak asymmetrical short circuit current at 10ms ($i_{p-e}$) for a 1φ-E short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
<tr>
<td>RMS value of the initial symmetrical short circuit current ($I_{k-e''}$) for a 1φ-E short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
<tr>
<td>RMS value of the symmetrical short circuit current at 100ms ($I_{k-e(100)}$) for a 1φ-E short circuit fault at the <strong>Connection Point</strong></td>
<td>kA</td>
</tr>
</tbody>
</table>

| **Circuit Data** | |
| Circuit schematic diagram and geographic diagram showing normal open points | Diagram |
| Circuit impedances (R, X, B positive & zero sequence) | Specify |
| Circuit ratings and any seasonal variations | Specify |
| Is the network operated radial or non-radial? | Text |
| Circuit transformer voltage ratios eg HV/433/250 | kV/V/V |
| Are circuit transformers zoned by applying the progressively higher tap settings for each group of transformers in zones along the circuit to optimise voltage regulation? | Y/N |

<p>| <strong>Transformer Data (for each transformer)</strong> | |
| Transformer identifier | Text |
| Rated voltage ratio (on principal tap) | kV/kV |
| Winding configuration eg Dyn11 | Text |
| Rated (apparent) power | MVA |
| Type of tap changer (on load / off circuit) | Text |
| Tap changer rating (forward and reverse power) | MVA / MVA |
| Tap step size | % |
| Maximum ratio tap | % |</p>
<table>
<thead>
<tr>
<th><strong>DATA DESCRIPTION</strong></th>
<th><strong>UNITS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5d DNO Network Data (see note 1)</strong></td>
<td></td>
</tr>
<tr>
<td>Minimum ratio tap</td>
<td>%</td>
</tr>
<tr>
<td>Normal tap position</td>
<td>%</td>
</tr>
<tr>
<td>Method of voltage control (voltage / LDC / NRC / other)</td>
<td>Text / Report</td>
</tr>
<tr>
<td>Controlled busbar (high-voltage side / low-voltage side / remote busbar)</td>
<td>Text</td>
</tr>
<tr>
<td>Target voltage and limits</td>
<td>kV, ±%</td>
</tr>
<tr>
<td>Normal system voltage on the high-voltage side</td>
<td>kV</td>
</tr>
<tr>
<td>Normal system voltage on the low-voltage side</td>
<td>kV</td>
</tr>
<tr>
<td>Positive sequence resistance</td>
<td>% on rating</td>
</tr>
<tr>
<td>Positive sequence reactance at principal tap</td>
<td>% on rating</td>
</tr>
<tr>
<td>Zero sequence resistance</td>
<td>% on rating</td>
</tr>
<tr>
<td>Zero sequence reactance</td>
<td>% on rating</td>
</tr>
<tr>
<td>Method of earthing of the high-voltage winding</td>
<td>Text</td>
</tr>
<tr>
<td>Method of earthing of the low-voltage winding</td>
<td>Text</td>
</tr>
</tbody>
</table>

**Notes:**

1. **Users** are advised to refer to network data items published in the **DNO's** Long Term Development Statement.
### DATA DESCRIPTION

<table>
<thead>
<tr>
<th>5e Embedded Transmission System Data</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
</table>

#### EMBEDDED TRANSMISSION SYSTEM LOCATION & OPERATION

<table>
<thead>
<tr>
<th>Embedded Transmission System name</th>
<th>Text</th>
<th>SPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postal address or site boundary plan (1/500)</td>
<td>Text / Plan</td>
<td>SPD</td>
</tr>
<tr>
<td>Connection Point (OS grid reference or description)</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Connection Point voltage</td>
<td>V</td>
<td>SPD</td>
</tr>
<tr>
<td>Single line diagram of existing and proposed connections or Operation Diagrams when available</td>
<td>Diagram</td>
<td>SPD</td>
</tr>
<tr>
<td>Number of Power Stations and/or Generation Sets connected to the Embedded Transmission System</td>
<td>Number</td>
<td>SPD</td>
</tr>
<tr>
<td>Operating regime of Power Station and/or Generation Sets – intermittent or non-intermittent (see note 1)</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Means of carrying out voltage control and/or power factor control at the Connection Point</td>
<td>Report</td>
<td>SPD</td>
</tr>
<tr>
<td>Embedded Transmission System performance chart (net, at Connection Point, as per DPC7 Figure 1)</td>
<td>Figure</td>
<td>DPD</td>
</tr>
</tbody>
</table>

#### EMBEDDED TRANSMISSION SYSTEM IMPORT REQUIREMENTS (see note 2)

| Maximum Active Power import | MW | SPD |
| Maximum Reactive Power import (lagging) | MVAr | SPD |
| Maximum Reactive Power export (leading) | MVAr | SPD |
| Requirements for Top - Up and / or Standby supplies | Text | SPD |

#### EMBEDDED TRANSMISSION SYSTEM EXPORT REQUIREMENTS (see note 3)

<p>| Total Embedded Transmission System output at Registered Capacity (net of auxiliary loads) | MW | SPD |
| Registered Capacity (maximum Active Power export) | MW | SPD |
| Maximum Reactive Power export (lagging) | MVAr | SPD |
| Maximum Reactive Power import (leading) | MVAr | SPD |</p>
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Embedded Transmission System output at Minimum Generation</strong> (net of auxiliary loads)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Generation</strong> (minimum Active Power export)</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Maximum Reactive Power</strong> export (lagging)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Maximum Reactive Power</strong> import (leading)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Embedded Transmission System MAXIMUM FAULT CURRENT CONTRIBUTION</strong> (see note 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak asymmetrical short circuit current at 10ms (i_p) for a 3φ short circuit fault at the Connection Point</td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>RMS value of the initial symmetrical short circuit current (I_k'') for a 3φ short circuit fault at the Connection Point</td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>RMS value of the symmetrical short circuit current at 100ms (I_{k(100)}) for a 3φ short circuit fault at the Connection Point</td>
<td>kA</td>
<td>SPD</td>
</tr>
<tr>
<td>Short circuit time constant (T''), corresponding to the change from (I_k'') to (I_{k(100)})</td>
<td>s</td>
<td>DPD</td>
</tr>
<tr>
<td>Positive sequence X/R ratio at the instant of fault</td>
<td>-</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Embedded Transmission System INTERFACE ARRANGEMENTS</strong> (see note 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means of connection, disconnection and synchronising between DNO and User</td>
<td>Method statement</td>
<td>SPD</td>
</tr>
<tr>
<td>Site protection / co-ordination arrangements with DNO</td>
<td>Report</td>
<td>DPD</td>
</tr>
<tr>
<td>Site communications, control and monitoring (HV / LV)</td>
<td>Report</td>
<td>DPD</td>
</tr>
</tbody>
</table>

**Notes:**

1. Intermittent and Non-intermittent Generation is defined in ER P2/6 as follows:
   - Intermittent Generation: Generation plant where the energy source for the prime mover can not be made available on demand
   - Non-intermittent Generation: Generation plant where the energy source for the prime mover can be made available on demand

2. This section relates to operating conditions when the Embedded Transmission System is importing Active Power, typically when it is not generating. The maximum Active Power import requirement and the associated maximum Reactive Power import and/or export requirements should be stated.

3. This section relates to operating conditions when the Embedded Transmission System is exporting Active Power. The Active Power export and associated maximum Reactive Power range should be stated for operation at Registered Capacity and for operation at Minimum Generation.

4. See ER G74, ETR 120 and IEC 60909 for guidance on short-circuit current data. Additionally, fault current contribution data may be provided in the form of detailed graphs, waveforms and/or tables.
5. The interface arrangements need to be agreed and implemented between the **User** and the **DNO** before energisation and consideration should be given to addressing the Distribution Code requirements including DGC5, DGC8, DPC6.7, DPC7.2.6, DOC5, DOC7.4, DOC8.6.3, DOC8.6.4, DOC9 and DOC10. For example DOC7 requires up to date contact details and procedures are required to establish an effective means of communication between the **Generator** and the **DNO**.
### Schedule 6

**DATA REGISTRATION CODE**

**DEMAND FORECASTS**

<table>
<thead>
<tr>
<th><strong>DATA DESCRIPTION</strong></th>
<th><strong>UNITS</strong></th>
<th><strong>TIME PERIOD COVERED</strong></th>
<th><strong>UPDATE TIME</strong></th>
<th><strong>DATA CATEGORY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Half hour Active Power and Power Factor at Annual ACS Conditions for specified time of the annual peak half hour at the associated Grid Supply Points and at the specified time of the annual peak half-hour of the National Electricity Transmission System Demand</td>
<td>MW/ MVar</td>
<td>8 weeks - 3 years</td>
<td>Week 35</td>
<td>OD</td>
</tr>
<tr>
<td>2. Half hour Active Power and Power Factor at Average Conditions at the specified half hour of the annual minimum National Electricity Transmission System Demand.</td>
<td>MW/ MVar</td>
<td>8 weeks - 3 years</td>
<td>Week 35</td>
<td>OD</td>
</tr>
<tr>
<td>3. Half hour Power output of Embedded Generating Plant and/or Embedded Transmission System at the specified half hour of the annual peak half hour of the National Electricity Transmission System</td>
<td>MW</td>
<td>8 weeks - 3 years</td>
<td>Week 35</td>
<td>OD</td>
</tr>
<tr>
<td>4. Schedules for the operation of Embedded Generation Sets and/or Embedded Transmission Systems whose output is greater than 5MW on a half-hourly basis</td>
<td>MW Date Time</td>
<td>2 weeks to 8 weeks ahead</td>
<td>1600 hrs Friday</td>
<td>OD</td>
</tr>
<tr>
<td>DATA DESCRIPTION</td>
<td>UNITS</td>
<td>TIME PERIOD COVERED</td>
<td>UPDATE TIME</td>
<td>DATA CATEGORY</td>
</tr>
<tr>
<td>------------------</td>
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<td>---------------------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>5. Suppliers will provide details of their proposed use of Demand Control measures aggregated to 5MW or more (averaged over any half hour) on a half hourly basis for each DNO Connection Point.</td>
<td>MW, Date, Time</td>
<td>2 weeks to 8 weeks ahead</td>
<td>1600 hrs Friday</td>
<td>OD</td>
</tr>
<tr>
<td>6. Customers, Suppliers, Other Network Operators and other DNOs connected to the DNO’s Distribution System shall notify the DNO where their or their Customers operations are likely to result in an aggregated change in Demand at the DNO Connection Point of supply of greater than 5MW of the Demand at that time on a half hourly basis.</td>
<td>MW, Date, Time</td>
<td>2 weeks to 8 weeks ahead</td>
<td>1600 hrs Friday</td>
<td>OD</td>
</tr>
<tr>
<td>7. Items 5, 6 and 7 above updated.</td>
<td></td>
<td>2 days to 12 days ahead</td>
<td>0900 hrs each Wednesday</td>
<td>OD</td>
</tr>
<tr>
<td>8. Details of differences greater than 5MW from the schedules of operation of any Embedded Generating Plant and/or Embedded Transmission System on a half-hourly basis submitted under item 5 above.</td>
<td>MW, Date, Time</td>
<td>0 - 24 hrs ahead</td>
<td>As specified</td>
<td>OD</td>
</tr>
<tr>
<td>9. Details from Suppliers of any differences of the amount and donation of their proposed use of Customer Demand Control (aggregated over any half hourly basis submitted under item 6 above).</td>
<td>MW, Date, Time</td>
<td>0 - 24 hrs ahead</td>
<td>As specified</td>
<td>OD</td>
</tr>
<tr>
<td>DATA DESCRIPTION</td>
<td>UNITS</td>
<td>TIME PERIOD COVERED</td>
<td>UPDATE TIME</td>
<td>DATA CATEGORY</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>--------------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td><strong>10.</strong> Details from each User connected to the DNO’s Distribution System of any change in aggregate Demand at the point of surplus of greater than 5MW of the Demand.</td>
<td>MW</td>
<td>0 - 24 hrs ahead</td>
<td>As specified</td>
<td>OD</td>
</tr>
<tr>
<td><strong>11.</strong> Details of half hour Active Power and Reactive Power output sent out to the DNO’s Distribution System by Embedded Generating Plant and/or Embedded Transmission System during the previous day on a half hourly basis.</td>
<td>MW, MVAr</td>
<td>Previous day</td>
<td>0300</td>
<td>OD</td>
</tr>
<tr>
<td><strong>12.</strong> Suppliers, Other Network Operators and other DNOs connected to the DNO’s Distribution System will provide details of the amount and duration of Demand Control at the DNO Connection Point aggregated to 5MW or more (arranged over any half hour) which was implemented during the previous Operational Day.</td>
<td>MW</td>
<td>Previous day</td>
<td>0300</td>
<td>OD</td>
</tr>
</tbody>
</table>
Schedule 7a

OPERATIONAL PLANNING - LONG TERM

YEARS 3 AHEAD-

EMBEDDED GENERATORS CONNECTED TO THE DNO’S DISTRIBUTION SYSTEM AS SPECIFIED BY THE DNO

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME PERIOD COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For individual Generation Sets or Embedded Transmission Systems the Set/System number and Generation Set/ Embedded Transmission System capacity. Preferred outage dates earliest start date latest finish date.</td>
<td>MW Date</td>
<td>Years 3 ahead</td>
<td>Week 2</td>
<td>OD</td>
</tr>
<tr>
<td>2. DNO advise Embedded Generators of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) details of Embedded Generating Plant or Embedded Transmission System they may withdraw from service.</td>
<td>Date</td>
<td>Years 3 ahead</td>
<td>Week 12</td>
<td>OD</td>
</tr>
<tr>
<td>(b) Output Usable requirements.</td>
<td>MW Date</td>
<td>Years 3 ahead</td>
<td>Week 12</td>
<td>OD</td>
</tr>
<tr>
<td>3. Embedded Generators provide DNO with</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) update of provisional Embedded Generating Plant or Embedded Transmission System outage programme.</td>
<td>Date</td>
<td>Years 3 ahead</td>
<td>Week 12</td>
<td>OD</td>
</tr>
<tr>
<td>(b) Registered Capacity.</td>
<td>MW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Neutral weekly Output Usable forecasts.</td>
<td>Date</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. DNO following discussion with Embedded Generator will notify, with reason, revision to the provisional Embedded Generating Plant or Embedded Transmission System outage programme.</td>
<td>Date</td>
<td>Years 3 ahead</td>
<td>Week 28</td>
<td>OD</td>
</tr>
<tr>
<td>DATA DESCRIPTION</td>
<td>UNITS</td>
<td>TIME PERIOD COVERED</td>
<td>UPDATE TIME</td>
<td>DATA CATEGORY</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-------</td>
<td>---------------------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>5. DNO following discussion with Embedded Generator will notify, with reason, revisions to the provisional Embedded Generating Plant or Embedded Transmission System outage programme. (This taking into account User outages received in Week 28).</td>
<td>Date</td>
<td>Years 3 ahead</td>
<td>Week 42</td>
<td>OD</td>
</tr>
<tr>
<td>6. DNO following discussion with Users agree Users outages.</td>
<td>Date</td>
<td>Years 3 ahead</td>
<td>Week 43</td>
<td>OD</td>
</tr>
</tbody>
</table>
Schedule 7b

OPERATIONAL PLANNING - MEDIUM TERM

YEARS 1-2

EMBEDDED GENERATORS CONNECTED TO THE DNO’S DISTRIBUTION SYSTEM AS SPECIFIED BY THE DNO

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME PERIOD COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For individual Generation Sets or Embedded Transmission System the Set/System numbers and Embedded Generating Plant/Embedded Transmission System capacity. Preferred outage dates earliest start date latest start date.</td>
<td>MW Date Years 1 - 2</td>
<td>Week 2</td>
<td>OD</td>
<td></td>
</tr>
<tr>
<td>2. Embedded Generators provide the DNO with estimates of:-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Output Usable</td>
<td>MW Date Years 1 - 2</td>
<td>Week 10</td>
<td>OD</td>
<td></td>
</tr>
<tr>
<td>(b) outage programme</td>
<td>Date Year 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. DNO following discussion with Embedded Generator provide:-</td>
<td>Date Years 1 - 2</td>
<td>Week 12</td>
<td>OD</td>
<td></td>
</tr>
<tr>
<td>(a) Details of Embedded Generating Plant or Embedded Transmission System they may withdraw from service for an outage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Update of Embedded Generator outage programme.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. DNO notify each Embedded Generator of Output Usable requirements.</td>
<td>MW Date Years 1 - 2</td>
<td>Week 12</td>
<td>OD</td>
<td></td>
</tr>
<tr>
<td>5. Embedded Generator provides estimates of Output Usable of each Embedded Generating Plant or Embedded Transmission System</td>
<td>MW Date Years 1 - 2</td>
<td>Week 41</td>
<td>OD</td>
<td></td>
</tr>
</tbody>
</table>
### Schedule 7c

**OPERATIONAL PLANNING - SHORT TERM**

**EMBEDDED GENERATORS CONNECTED TO THE DNO’S DISTRIBUTION SYSTEM AS SPECIFIED BY THE DNO**

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME PERIOD COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. For individual Generation Sets or Embedded Transmission Systems the Set/System number and Embedded Generating Plant/ Embedded Transmission System capacity. Duration of outage earliest start date latest finishing date.</td>
<td>MW Date</td>
<td>Weeks 9 - 52</td>
<td>Week 2</td>
<td>OD</td>
</tr>
<tr>
<td><strong>Output Usable estimates.</strong></td>
<td>MW Date</td>
<td>Weeks 9 - 52</td>
<td>Week 2</td>
<td>OD</td>
</tr>
<tr>
<td>2. DNO informs Embedded Generators of Output Usable requirements.</td>
<td>MW Date</td>
<td>Weeks 9 - 52</td>
<td>Week 4</td>
<td>OD</td>
</tr>
<tr>
<td>3. Embedded Generators provide DNO with Embedded Generating Plant or Embedded Transmission System Output Usable estimates.</td>
<td>MW Date</td>
<td>Weeks 18 - 52</td>
<td>Week 10</td>
<td>OD</td>
</tr>
<tr>
<td>4. DNO informs Embedded Generators of change to Output Usable requirements.</td>
<td>MW Date</td>
<td>Weeks 18 - 52</td>
<td>Week 12</td>
<td>OD</td>
</tr>
<tr>
<td>5. Embedded Generators provide DNO with Embedded Generating Plant or Embedded Transmission System Output Usable estimates.</td>
<td>MW Date</td>
<td>Weeks 28 - 52</td>
<td>Week 25</td>
<td>OD</td>
</tr>
<tr>
<td>6. DNO informs Embedded Generators of changes to Output Usable requirements.</td>
<td>MW Date</td>
<td>Weeks 31 - 52</td>
<td>Week 27</td>
<td>OD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7. <strong>Embedded Generators</strong> will provide estimates of <strong>Embedded Generating Plant or Embedded Transmission System Output Usable</strong>.</td>
<td>MW Date</td>
<td>Weeks 44 - 52</td>
<td>Week 41</td>
<td>OD</td>
</tr>
<tr>
<td>8. <strong>DNO</strong> inform contracted <strong>Embedded Generators</strong> of changes to <strong>Output Usable</strong> requirements.</td>
<td>MW Date</td>
<td>Weeks 44 - 52</td>
<td>Week 43</td>
<td>OD</td>
</tr>
</tbody>
</table>
**DATA REGISTRATION CODE**

**OPERATIONAL PLANNING - USER PLANT, APPARATUS AND SYSTEMS**

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>TIME PERIOD COVERED</th>
<th>UPDATE TIME</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Users</strong> provide the <strong>DNO</strong> with details of proposed outages which may affect the performance of the <strong>DNO's Distribution System</strong>. Details of trip testing, risks of trip and other information where known which may affect the security and stability of the <strong>DNO’s Distribution System</strong> shall also be included.</td>
<td>Dates</td>
<td>Years 1 - 2 and Years 3 ahead</td>
<td>Week 28</td>
<td>OD</td>
</tr>
<tr>
<td>Update of previously submitted data for year 3 ahead.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Following consultation with <strong>Users</strong> and <strong>DNO</strong> will include agreed outage proposals in the programme.</td>
<td>Date</td>
<td>Years 3 ahead Years1 - 2</td>
<td>Week 43 Week 48</td>
<td>OD OD</td>
</tr>
<tr>
<td>As changes occur.</td>
<td>Update of <strong>Users</strong> proposals agreed in the Medium Term Plan.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Schedule 8

**DATA REGISTRATION CODE**

**SYSTEM DESIGN INFORMATION**

<table>
<thead>
<tr>
<th><strong>DATA DESCRIPTION</strong></th>
<th><strong>UNITS</strong></th>
<th><strong>DATA CATEGORY</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Information:</strong></td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Type of load and control arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum load on each phase at time of Peak Demand</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fluctuating Loads:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate of change of <strong>Demand – Active Power</strong> and <strong>Reactive Power</strong> increasing and decreasing</td>
<td>MW/s, MVAr/s</td>
<td>DPD</td>
</tr>
<tr>
<td>Shortest repetitive time intervals between fluctuations in <strong>Demand Active Power</strong> and <strong>Reactive Power</strong></td>
<td>s</td>
<td>DPD</td>
</tr>
<tr>
<td>Largest step change <strong>Active Power</strong> and <strong>Reactive Power</strong> increasing and decreasing</td>
<td>MW/s, MVAr/s</td>
<td>DPD</td>
</tr>
<tr>
<td>Maximum energy <strong>Demand</strong> per half hour</td>
<td>MWh</td>
<td>DPD</td>
</tr>
<tr>
<td>Steady state residual <strong>Demand</strong> (MW) between <strong>Demand</strong> fluctuations</td>
<td>MW</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Reactive Compensation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rating of individual shunt reactors (not associated with cables)</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td>Rating of individual capacitor banks</td>
<td>MVAr</td>
<td>DPD</td>
</tr>
<tr>
<td>Details of any automatic control logic such that operating characteristics can be determined</td>
<td>Text/Diagrams</td>
<td>DPD</td>
</tr>
<tr>
<td>Point of connection to the <strong>System</strong></td>
<td>Diagram</td>
<td>DPD</td>
</tr>
<tr>
<td><strong>Lumped Network Susceptance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Details of the equivalent lumped network susceptance of the <strong>User System</strong> referred back to the connection with the <strong>DNO’s Distribution System.</strong></td>
<td>MVAr</td>
<td>DPD</td>
</tr>
</tbody>
</table>
Including shunt reactors which are an integrated part of a cable system and which are not normally in or out of service independent of the cable.

Excluding independently switched reactive compensation connected to the User System and any susceptance of the User System inherent in the active and reactive Demand.

### Fault Infeeds

- Maximum and minimum short circuit infeeds into the DNO's Distribution System: MVA
- X/R ratio under maximum and minimum short circuit conditions: DPD
- [Contribution from rotating plant]: DPD
- Equivalent network information at the request of the DNO: DPD
- Interconnection Impedance: DPD

For User interconnections that operate in parallel with the DNO’s Distribution System details of the interconnection impedance shall be exchanged between the DNO and User, including:

- Positive Sequence Resistance
- Zero Sequence Resistance
- Positive Sequence Reactance
- Zero Sequence Reactance
- Susceptance

If the impedance in the view of the DNO is low then more detailed information will be requested.

### Demand Transfer Capability

Information shall be exchanged on Demand transfer capability where the same Demand may be supplied from alternative DNO or User points of supply including the proportion of Demand normally fed from each point of supply: MW
<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>The arrangements for manual/automatic transfer under planned/outage conditions should be provided</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Non - DNO System Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The DNO will request information on circuit parameters, switchgear and Protection arrangements</td>
<td>Text/ Diagrams</td>
<td>DPD</td>
</tr>
<tr>
<td>Transient Overvoltages</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Demand Profile For Day Of Exit Point Peak Demand</td>
<td></td>
<td>DPD</td>
</tr>
<tr>
<td>Demand Profile For Day Of Exit Point Minimum Demand</td>
<td></td>
<td>DPD</td>
</tr>
</tbody>
</table>
**Schedule 9**

**DATA REGISTRATION CODE**

**LOAD CHARACTERISTICS**

<table>
<thead>
<tr>
<th>DATA DESCRIPTION</th>
<th>UNITS</th>
<th>DATA CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical and electrical point of connection and date connection required</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Diagrams existing and proposed connections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of Demand:-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Active Power Demand Registered Capacity</td>
<td>MW</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum and minimum Reactive Power requirement</td>
<td>MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Type of load and control arrangements. Eg variable speed motor type of starter employed</td>
<td>Text</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum Phase Voltage Unbalance</td>
<td>Ratio/ Phase at the time</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum harmonic content</td>
<td>% THVD</td>
<td>SPD</td>
</tr>
<tr>
<td>Fluctuating Loads:-</td>
<td>Graphical</td>
<td>SPD</td>
</tr>
<tr>
<td>Graphical indication of typical cycle variation of Demand (Active / Reactive)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load Management Data</td>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>Maximum short circuit infeed based on Generation Set subtransient reactance</td>
<td>MVA</td>
<td>SPD</td>
</tr>
<tr>
<td>Maximum zero phase sequence impedance of the User’s System at the connection point</td>
<td>% on 100 MVA</td>
<td>SPD</td>
</tr>
<tr>
<td>2 hour Demand profiles for Peak Demand</td>
<td>MW and MVAr</td>
<td>SPD</td>
</tr>
<tr>
<td>Monthly Peak Demand variation</td>
<td>MW and MVAr</td>
<td>SPD</td>
</tr>
</tbody>
</table>
GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

Issue 19 of The Distribution Code of Licensed Distribution Operators of Great Britain

September 2013
NOTE - This Guide is provided to prospective Users of the **DNO’s Distribution System** for their information only and does not constitute part of the Distribution Code. Terms defined in the Distribution Code have initial capitals.

The Guide describes the provisions of the Distribution Code, which are mainly of a technical nature, in the context of the overall commercial and administrative arrangements for connection to the Distribution System covered in the Distribution Licence.

1. ELECTRICITY SUPPLY INDUSTRY

The principal functions within the Electricity Supply Industry are Generation, Transmission, Distribution, Supply and Metering.

1.1 Generation

Electricity is generated from a number of fuels, principally from nuclear energy, natural gas, coal, and water. A number of renewable sources are under continual development and output from wind, waste and biomass sources is expected to increase.

1.2 Transmission

The major Power Stations are connected to the Transmission System (The Grid) which operates as a fully interconnected system within Scotland, England and Wales. The Grid operates at 275kV and 400kV. The 132kV network in Scotland is also classed as part of the Transmission System but this is not the case in England and Wales. The Transmission System provides a secure supply of electricity to Grid Supply Points, ie the Grid Exit Points, which are also the Entry Points to the Distribution System, and also to the Exit Points for Customers with large or special Demands.

1.3 Distribution

The Distribution System operates at nominal voltages of 66kV, 33kV and 22kV (EHV), 11kV and 6.6kV (HV) and 400 volts and 230 volts (LV). The 132kV network in England and Wales is also classed as part of the Distribution System but this is not the case in Scotland. The Distribution System provides a supply to the Exit Points to all remaining Customers for industrial, commercial and domestic purposes. The voltage of the connection depends on Demand, the purpose for which the supply is used and the local technical requirements of the Distribution System. An increasing output from small Generators is connected directly to the Distribution System and these are termed Dispersed, Distributed or Embedded, Generators. The terms are synonymous and Embedded will be used throughout the Distribution Code.

1.4 Supply

The Supply Function deals with the marketing of electricity, billing and commercial aspects of the use of electricity.
1.5 Metering

Metering is used to measure real time power flows within the various Systems to allow them to be operated within ratings and to match supply with Demand. Metering is also used to record the amount of electrical energy produced by Generators, transferred over the grid and onto the Distribution System. Metering also records the amount of energy consumed by Customers and Suppliers for billing purposes.

2 PRINCIPAL ORGANISATIONS

The following outlines the principal organisations involved in fulfilling the functions described above.

(a) The DNOs, as holders of Distribution Licences under the Electricity Act 1989 as amended, who own and operate the Distribution System, and who are under a statutory duty to provide a connection to the Distribution System and to distribute electricity on request.

(b) Generators who are licensed under the Electricity Act 1989 as amended or licence exempt and who are independent of the DNOs.

(c) Suppliers who supply electricity under licence or exemption under the Electricity Act 1989 as amended. There is only one class of licensed Supplier and the term “Public Electricity Suppliers (PES)” is now defunct. However certain Suppliers including the supply businesses of the former PESs continue to have a statutory obligation to supply electricity on request.

(d) Customers with Own Generation who have Generating Plant for supplying their own needs, although they may sell a certain amount of electricity without a licence.

(e) The Licensed Meter Operator who owns metering assets and provide metering services. The Licensed Meter Operator may be a subsidiary of the DNO, or an independent provider of metering services.

3 PRINCIPLES OF AN INTERCONNECTED SYSTEM

3.1 General

The benefits of the interconnection of individual generating stations and the supply of electricity from such interconnected systems to discrete load centres have long been recognised worldwide. High Voltage interconnected systems confer on electricity supply the advantages of increased security of supply and greater economy arising from the immediate accessibility of the required mix of generation at any time.
3.2 Demand Forecasting

Since electricity cannot be stored in bulk until it is needed it has to be generated in the correct quantities at virtually the instant it is required, otherwise the supply voltage and frequency will deviate outside fairly narrow statutory limits with both undesirable and possibly harmful effects. Because of this property it is necessary to forecast total Demand from all Suppliers on a daily basis so that the minute-by-minute operation of Power Stations can be scheduled. A mismatch will immediately affect the quality of supply to Suppliers’ Customers and can arise from unexpected occurrences like sudden changes in weather leading to large swings in the Demand for electricity or breakdowns on the interconnected system or on Generating Plant. It normally takes several hours for Generation Sets to become available. Therefore to offset the effect of any occurrences a reserve or security margin of Generating Plant is required to be available to provide electricity at very short notice. It is also necessary to forecast Demand in the longer term to programme the reinforcement of the interconnected network.

3.3 System Security

Standard procedures are necessary to ensure that the interconnected system is developed, operated, maintained and used to transmit and distribute supply to the load centres and Suppliers’ Customers in a secure and efficient manner during normal and abnormal conditions. It is necessary to specify the technical requirements for the development of the interconnected system and the technical requirements for connection to it. Any failure to meet with these minimum requirements can lead to reduced security and efficiency or to disturbances or events causing undesirable effects on the System. It is also necessary to plan outages of Generation Sets and of the interconnected system to preserve Demand Control and match generation to Demand.

3.4 Industry Structure

In Scotland, electricity transmission is owned by SP Transmission Ltd and Scottish Hydro-Electric Transmission Ltd. They are responsible for the planning and development of their transmission systems. In England and Wales, the National Grid Company owns the transmission system, and is responsible for its planning and development. NGC is also responsible for the day to day control of the whole GB Transmission System (ie the transmission systems of NGC, SPT and SHETL taken together) as the GB System Operator. In this role they are also responsible for offering connections to the GB Transmission System to Users. NGC has no interests in generation or supply.

DNOs own and operate the Distribution Systems in both Scotland and in England and Wales. In Scotland, the two DNOs are affiliated to the respective Scottish transmission companies. Some DNOs have affiliates which are involved in generation and the supply of electricity. Generation and supply are fully competitive activities. Licence obligations on DNOs and the Scottish transmission licensees require the distribution businesses to be operated separately from the competitive businesses, that they facilitate competition, that they do not discriminate between different users, and that they maintain confidentiality of information.
In addition there is the opportunity for competition in the construction of connections to the transmission and distribution systems.

The electricity market now also operates across Scotland and England and Wales under the arrangements established under the Energy Act 2004 and the BETTA trading arrangements. The historic differences in structure and market operation lead to some minor differences in terminology and information exchange requirements. However the technical requirements of Distribution Systems are identical and a common Distribution Code has been adopted for Great Britain as a whole, with a small number of alternative provisions for Scotland and England and Wales.

4 GRID AND DISTRIBUTION CODES

It is a requirement of the Licences that Codes be prepared and at all times be in force covering all technical aspects relating to connection to and the planning, operation and use of the interconnected system, and the operation of electrical lines and electrical Plant and Apparatus connected to that System. There are two such Codes which will apply to the appropriate parts of the System and to those who are connected to it.

(a) The Grid Code which is a condition of the Transmission Licence and relates to the Transmission System and connections to it.
(b) The Distribution Code which is a condition of the Distribution Licence and relates to the Distribution System and connections to it.

The Grid Code and the Distribution Code are approved by the Authority. The Office of Gas and Electricity Markets (Ofgem fulfils the function of the Authority) and are essential to ensure that the total electricity supply System operates efficiently, so as to provide, as far as is reasonably practicable, a secure high quality supply to Customers.

The relationship between the Grid Code and the Distribution Code is shown diagrammatically in the relevant Figure 1 to this Guide.

5 DISTRIBUTION CODE

5.1 General

The Distribution Code covers all material technical aspects relating to connections to and the operation and use of the Distribution Systems of the DNOs. However, it is not exhaustive as to the requirements to be complied with by those connected to the Distribution System who must also comply with the requirements of the Electricity Act 1989, the Electricity Safety, Quality and Continuity Regulations and all other relevant legislation which from time to time comes into force.

The principles contained in the Distribution Code shall apply to all Users, ie all persons and companies connected to the Distribution System:

(a) Customers, classified by Demand and connection voltage. (It is not intended that the Distribution Code should generally apply to small Customers individually; their obligations will be dealt with on their behalf by their Suppliers.
(b) Suppliers.
GUIDE TO THE DISTRIBUTION CODE OF GREAT BRITAIN

(c) Embedded Generators classified by output and connection voltage.
(d) Other Authorised Distributors connected to the System.
(e) Meter Operators, via Suppliers.

The Distribution Code does not deal with charges and other commercial terms relating to

(a) A connection to the System.
(b) Supplies of electricity.
(c) The use of the Distribution System for the transport of electricity.

Statements setting out the principles of connection to and use of the Distribution System are covered in the Distribution Licence and summarised in this Guide. Further details and the calculation of such charges, together with current prices, are available from the DNOs.

5.2 Distribution Code Review Panel

The DNOs are required to maintain a Distribution Code Review Panel comprising representatives of the DNOs, Ofgem and Users. The Panel maintains an ongoing review of the Distribution Code and its workings.

Users can pass to the Panel suggestions for changes to the Distribution Code at any time. Users can also ask the Panel to issue guidance in relation to the implementation, performance and interpretation of the Code.

5.3 Distribution Code Sections

The Code is prepared by the DNOs and is specifically designed to:

(a) Permit the development, maintenance and operation of an efficient co-ordinated and economic system for the distribution of electricity.
(b) Facilitate competition in the generation and supply of electricity.

The Code covers the Distribution Systems of the DNOs which are defined so as to include Equipment at 33kV and below in Scotland and 132kV and below in England and Wales.

The Code comprises several sections which identify the responsibilities of both the host DNO and Users with regard to connection to and use of the Distribution System:

(i) Glossary and Definitions, defines terms used in the Distribution Code.
(ii) Introduction to the Distribution Code.
(iii) General Conditions, apply to all aspects of the Distribution Code and are intended to ensure that the Code works to the benefit of all Users.
(iv) Planning and Connection Code, specifies technical, design and operational criteria and procedures applied by DNOs in planning and developing the Distribution System and with which Users must comply when seeking a connection.
(v) **Operating Code**, sets out operating procedures at the interface with Users and requires Users of the Distribution System to provide load and/or generation output information to the DNOs.

(vi) **Data Registration Code**, provides guidelines for the collection and assembly of information exchanged between Users and DNOs under the various sections of the Distribution Code.

Subsequent sections of this Guide consider in turn the main Distribution Code sections.

### 5.4 Distribution Planning and Connection Code

The Distribution Planning and Connection Code specifies technical and design criteria and the procedures to be applied by DNOs and Users in the planning and development of the Distribution System, including information exchange.

In the event that reinforcement or extension of the Distribution System is required, the Distribution Licence imposes an appropriate timescale for the exchange of information between the DNO and Users subject to all parties observing, where appropriate, the confidentiality of such information.

#### 5.4.1 Design Principles and Standards (DPC4)

The characteristics of the Distribution System which must be provided by the **DNO** are specified in DPC 4.2, including security of supply and voltage and frequency limits.

The technical requirements for small Customers taking low voltage supplies of 100 amps and less are specified in DPC 4.3. Installations complying with BS7671 Requirements of Electrical Installations (wiring regulations) are deemed to comply with the Distribution Code.

The general technical requirements for larger installations are specified in DPC 4.4 which makes reference to Electricity Supply Industry Standards covering earthing arrangements. More complex requirements for High Voltage Customers, are specified in DPC 6 and DPC 8.

Industry interface standards are open to collective governance by the Panel. This is explained in Section 7 of this Guide.

#### 5.4.2 Network Statements (DPC4.5)

The DNO is required by the Authority (Ofgem) to prepare a Long Term Development Statement, for the whole of the DNO’s Distribution System, which gives information to assist prospective and existing Users when developing their distribution arrangements with the DNO.

In addition to this, prospective or existing Users can request a more detailed statement from the DNO showing its best estimate and forecast of the present and future circuit capacity, power flow and loading on the part or parts of the relevant Distribution System specified in the request.
This requested statement must be prepared as soon as practicable and in any event within 28 days of the requester agreeing to meet the cost of providing the information (see below), unless due to the complexity of the request, a longer timescale is sought by the DNO within 10 days of the request and agreed by Ofgem.

The Code makes it clear that the requested statement shall include:

(a) Such further information as the DNO considers necessary to the requester in the assessment of opportunities available for connection to or use of the Distribution System specified in the request.

(b) If so requested, a commentary setting out the DNO’s view as to the suitability of that part of the System for the purpose specified in the request.

The DNO will only omit supporting information from the statement on the grounds of confidentiality as required by the Distribution Licence. The omission of information will not invalidate the conclusions of the statement.

5.4.3 Charges for Information

A provision in the Distribution Licence allows the DNO to charge for providing such Planning Statements. These charges relate to reasonable costs in providing the statement. The exact procedure is as follows:

(a) The DNO may within 10 days of receipt of a request provide an estimate of its reasonable costs in preparing any statement.

(b) Provision of the requested information is conditional on the requester agreeing to pay the amount estimated or such other amount as Ofgem may direct, on application of the DNO or the person requesting such statement. on payment of the DNO's estimated costs or, such other amount as Ofgem may direct.

(c) The DNO must provide the information within 28 days of the date of the request, or if the DNO has provided an estimated cost for providing data, within 28 days of the date on which agreement to pay the charge is received.

5.4.4 Exchange of Information (DPC5)

DPC 5 (General Requirements for Connection) specifies the connection arrangements, and information requirements, in separate sections for small and large Users. The information required includes Active Power and Reactive Power requirements and information about disturbing loads to ensure that they comply with the standards referred to in DPC4 (5.4.1 above).

5.4.5 Embedded Generators (DPC7)

Embedded generation, that is generation directly connected to the Distribution System or Customers With Own Generation, can have a significant effect on Distribution Systems and the DNO will need to assess the impact of specific projects. Generators are classified by voltage and output power and the detailed technical standards to be applied and information required from Embedded Generators is set out in a composite section of the Planning and Connection Code (DPC7).
In England and Wales embedded generators of size between 50MW and 100MW, although generally exempt from being licensed, nevertheless are bound by some Grid Code requirements. However, as they have no relationship with NGC, these Grid Code requirements are reflected in Distribution Code requirements in Sections DPC7.5 and also in DOC 5.6. In Scotland, in SP Transmission’s area, these Grid Code requirements may apply to generators in the 5MW to 30MW range.

Customers who have domestic or micro generation complying with Engineering Recommendation G83/2 – “Recommendations For The Connection of Type Tested Small-Scale Embedded Generators (Up To 16A Per Phase) In Parallel With Public Low-Voltage Distribution Networks” are not classed as Generators for the purposes of the Distribution Code.

5.4.6 Application for Connection Procedures

Any person seeking to establish new or modified arrangements for connection to and/or use of the Distribution System must make their application to do so on standard forms provided by the DNO. However, in the case of large or technically complex connections full details appropriate to the scheme should be provided. The DNO will provide guidance in cases where the standard forms are not appropriate and full details are required.

Under the Competition in Connections policy applicants for new or modified connections may wish to take responsibility for some aspects of the associated work. The DNO will provide details of the scope and implications of contestable work on request.

5.4.7 Typical Areas for Discussion

During the Application Process the following is typical of the issues to be discussed.

(a) Will the System take X amount of additional power without upgrading? If not, how much will it take before a major upgrade is required?

(b) If there are network constraints, what are they? Are they acceptable? A constraint may reflect a system capacity limit which requires the System to be switched off for maintenance work. This may be for as little as one day per annum, or substantially longer and more frequent.

(c) Are there any major upgrading works scheduled in the area over the next 5 years which will reduce any connection costs?

(d) Can the amount of power required be provided by the local System without major upgrading, and at reasonable cost?

(e) By how much can the required supply capacity be increased without necessitating major upgrading? If a System upgrade is required what are the mechanisms for allocating the costs and benefits associated with the upgrade?

(f) What will be the supply voltage? Are there other options and what are the implications of the other options?

(g) How reliable is the supply (in statistical terms)? How will the supply be provided? Will it be mainly by overhead line, or by underground cable?
5.4.8 Requirement to Offer Terms

DNOs are required by the Distribution Licence to offer terms under which they are prepared to enter into an agreement with the applicant for establishment of the proposed new or modified connection to and/or use of the DNO’s Distribution System.

The offer will be made as soon as is practicable after receipt of an application containing all such information as the DNO may reasonably require for the purposes of formulating an offer and (save where the Authority (Ofgem) consents to a longer period) in any event not more than 28 days in the case of an application for use of System only or not more than 3 months in the case of an application for connection or use of System with connection. The offer shall specify, and the terms shall take account of, any works required for the extension or reinforcement of the DNO’s Distribution System or the Transmission System necessitated by the applicant's proposed activities and for the obtaining of any consents necessary for such purposes.

The extension or reinforcement required to the DNO’s Distribution System or the Transmission System to accommodate an application may be of such magnitude or complexity that the DNO considers that analysis of the proposal cannot reasonably be concluded within the specified timescale. In such circumstances, the Authority may agree to an extension, in which case the DNO shall, within the original timescale, provide a preliminary offer, indicating those areas which require more detailed analysis. On receipt of the preliminary offer, the User shall indicate whether it wishes the DNO to undertake the work necessary to proceed to a firm offer within a timescale to be specified by the Authority.

Where an offer made has lapsed or has been rejected by the applicant, the DNO shall refer to the Authority for his consideration, any further application received from that applicant within twelve months of the original application if, in the view of the DNO, the further application does not represent a significant change from the original application. The DNO shall not proceed with consideration of the further application unless and until the Authority confirms he considers the applicant to be acting reasonably under the terms of the Distribution Code.

5.4.9 Right to Reject an Application

The DNO shall reject an application for connection to or use of the DNO’s Distribution System only if it considers that any offer of terms for establishment of the proposed arrangements would place the DNO in breach of statutory obligations or other regulatory or licence conditions or if the applicant does not agree to comply with the Distribution Code.

5.4.10 Information Provided by the DNO

Once committed by signature the Connection/Use of System Agreement constitutes a contract between the DNO and the User. A signed contract may (but not always) reduce the scope for referring areas of dispute to Ofgem for determination. Users may wish to discuss these issues with Ofgem to satisfy themselves in this respect before signing a contract.
The contract includes a condition requiring both parties to comply with the Code. In particular for connection at High Voltage, both parties are required to sign a site responsibility schedule detailing the division of responsibility in relation to ownership, control, operation and maintenance of Plant and Apparatus. The Connection/Use of System Agreement requires the DNO to provide:

(a) Details of any capital related payments arising from necessary reinforcement or extension to the company’s Distribution System or Transmission System, and if required.

(b) Detailed costing arrangements for the supply of Standby and Top-up facilities.

5.4.11 Information Required From Users

Prospective and existing Users are required to provide sufficient Planning Data as requested by the DNO to allow compliance with its Distribution Licence. The required Planning Data is allocated to one of two categories, Standard Planning Data and Detailed Planning Data. The DNOs can provide proforma schedules for the submission of both Standard and Detailed Planning Data, although every effort will be made to minimize the complexity and detail of the data requested.

These schedules are included in the Distribution Data Registration Code section of the Distribution Code.

Standard Planning Data include items such as:

(a) The location of the connection and the date when connection is required.

(b) A requirement for diagrams (single line) of Plant and Apparatus and the type and electrical loading of equipment.

(c) Maximum and minimum parameters for Active Power Demand, Reactive Power etc. and details of any load management scheme adopted by the Active Power.

Detailed Planning Data, when required, includes data relating to Demand and load fluctuation. In some cases detailed information may need to be provided to allow a full assessment of the effect of the Users load on the Distribution Systems.

5.4.12 Status of Planning Data

For Distribution Planning and Connection Code purposes, planning data supplied by Users may be allocated to one of three status levels which provided a progression related to degrees of commitment and validation, as follows:

(a) Preliminary Project Planning Data - Data supplied by a User in conjunction with an application for connection or use of System shall be considered as Preliminary Project Planning Data until such time as a binding Connection/Use of System Agreement is established between the DNO and the applicant. This data shall be treated as confidential by the DNO.

Preliminary Project Planning Data will normally contain only Standard Planning Data, unless Detailed Planning Data is required to permit more detailed System studies by the DNO.
(b) **Committed Project Planning Data** - When a Connection/Use of System Agreement is established, the data relating to the User's development, and subsequent data required by the DNO under the Distribution Planning and Connection Code, shall have the status of Committed Project Planning Data. This data shall form the background against which any further applications from other Users shall be considered and against which planning of the DNO’s Distribution System shall be undertaken. Committed Project Planning Data may contain both Standard Planning Data and Detailed Planning Data.

(c) **Registered Project Planning Data** (For Users other than at Low Voltage) - The Distribution Planning and Connection Code requires that, before an agreed connection may be physically established, any estimated values contained within the Committed Project Planning Data shall be replaced, where practicable, by validated actual values and as appropriate by updated forecasts for future data items such as Demand. Data provided at this stage is termed Registered Project Planning Data. Registered Project Planning Data may contain both Standard Planning and Detailed Planning Data.

5.5 **Distribution Operating Code**

The objective of the Operating Code is to set out operating procedures at the interface with Users and to facilitate the exchange of information necessary to allow the DNO to operate the System so as to ensure maximum security and stability.

The Operating Code covers a number of specific aspects for which information and detailed procedures are required. Categories of information are identified by schedules in the Distribution Data Registration Code that are designed for the provision of the specific information:

(a) **Demand Forecasts** (DOC1) Generators and Customers whose Demand is greater than 5MW are required to provide information of their Demand as specified in DOC1.

(b) **Operational Planning** (DOC2) This section covers information intended mainly for Embedded Generators although operational procedures will need to be agreed with High Voltage Customers regarding planned plant maintenance which may affect the Customer's operations.

(c) **Testing and Monitoring** (DOC 5) To ensure that the Customer is not operating outwith the parameters of the Connection Agreement, the DNO has the right to test and monitor the Customer's supply at the Connection Point. The DNO must advise the Customer that tests are to be carried out and will make results available. The Customer may witness any of the tests carried out. Should the DNO establish that the Customer is operating outwith the agreed parameters the Customer faces the ultimate possibility of being disconnected from the Distribution System.

(d) **Demand Control** (DOC 6) In cases of extreme emergency, due to plant breakdown for example, where available Generating Plant is insufficient to meet the total Demand of Customers, it will be necessary to reduce the load on parts or all of the Distribution System. This section sets out the alternative methods which may be applied. Until the emergency has passed, Customers may be subject to rota disconnections.
(e) **Operational Liaison** (DOC 7) The Customer must nominate a person to be contacted and advised by the DNO’s nominated person of the possible risk of System disturbance or System security caused by Operations or Events on the Distribution System.

(f) **Safety Co-ordination** (DOC 8) This section sets out the responsibilities and requirements when working at or across the Operational and Ownership Boundaries.

(f) **Contingency Planning** (DOC 9) This section describes procedures to be undertaken following a complete or partial failure of the Distribution and Transmission Systems or civil emergency.

(h) **Event Reporting** (DOC 10) Any major incident, such as a fault on a Customer’s System, must be reported by the Customer to the DNO. Any oral report must be confirmed by a full written report as soon as possible after the incident.

(i) **Numbering and Nomenclature** (DOC 11) The DNO will be responsible for providing the Customer with circuit/apparatus, numbering/nomenclature at own ownership boundaries in accordance with agreed standards. Such information for new installations will be provided on an Operation Diagram as soon as possible.

(j) **System Test** (DOC 12) When the DNO or User intends to carry out a System Test which may affect supply to other Customers the DNO must inform all affected Customers in writing, giving details of the nature and purpose of the proposed System Tests. There are laid down time periods within the Code for giving Customers prior warning of any tests.

5.6 Distribution Data Registration Code

The Distribution Data Registration Code collates in a readily identified form the information exchanged between the DNO and Users under the various sections of the Code.

Data required by the DNO is allocated to one of three categories:

(a) **Standard Planning Data** is that data listed in the Planning and Connection Code which is required to be supplied by all Users when making application for connection to and/or use of the DNOs’ Distribution System.

(b) **Detailed Planning Data** is that data listed in the Planning and Connection Code which is required to be supplied by the User. This is more specific data relating to Demand, fluctuating loads etc. which could adversely affect the Distribution System. There may be some relaxation of the requirement to provide detailed planning data in the case of small Embedded Generators.

(c) **Operational Data** is data which is required by the Distribution Operating Code and should be supplied in accordance with the timetables set down in the relevant operating codes.

5.6.1 Procedures and Responsibilities

Data must be submitted to the DNO in writing and, where required, in the format of the schedules included in the Distribution Data Registration Code. These schedules are structured to serve as standard formats for data submission.
The registration code identifies procedures in the event that Users may wish to change data submitted or already registered with the DNO.

There is provision for the DNO to estimate data which Users have failed to supply. However, DNOs must notify Users in writing of any estimated data it intends to use.

A specific requirement of the Planning Code is that Registered Data is updated by Users on an annual basis.

6 CONNECTION TO THE DISTRIBUTION SYSTEM

6.1 Electricity Suppliers

Supplies of electrical energy to Customers within the DNO's authorised supply area will be made by the licensed Suppliers or exempted Suppliers. Each will be entitled, under a specific Agreement(s), to use both the Transmission and Distribution Systems for the transport of electrical energy from the Generating Plant to Customers.

By virtue of the conditions of its Distribution Licence, the DNO is obliged to offer use of its Distribution System to all Supply Businesses. The Licence provides that in doing so the DNO must not discriminate in favour of any Supply Business.

6.2 Connection Types

There are two types of connection to the DNO’s Distribution System, namely:

(a) Entry Point: That is the connection between the DNO’s Distribution System and the point where electricity enters the System, usually the Transmission System or an Embedded Generator.

(b) Exit Point: That is the connection between the DNO’s Distribution System and either the premises where the electricity is consumed or, in some cases, another Distribution System (owned, for example, by another Distributor and termed Other Authorised Distributor).

Note:- A connection may be an Entry and an Exit Point (Customer With Own Generation)

The DNO’s Distribution System may also be used

(a) To transport electricity between Entry and Exit Points.

(b) For the provision of Standby and/or Top-up supplies of electricity.

6.3 Connection Agreements and Use of System Agreements

Use of the Distribution System may require a Customer to sign a specific agreement(s) with the DNO. The following is given as a guide and is not intended to be exhaustive.

(a) Large power Customers shall be required to sign a Connection Agreement. In most cases low voltage Customers will only be required to sign a Supply Agreement with their Supplier.
(b) Embedded Generators shall be required to sign an Embedded Generator Connection Agreement, including specific technical and operating requirements, and may also require a Use of System Agreement.

(c) Suppliers shall be required to sign a Use of System Agreement.

(d) Top up and Standby agreements may be required by:

(i) A Supplier.

(ii) A Customer With Own Generation.

(iii) A Customer with an alternative supply not provided via the DNO’s Distribution System.

A prospective User, once committed by signature of a Connection/Use of System Agreement, is termed a “Committed User”.

A Connection/Use of System Agreement will constitute a contract between the DNO and the User, including as appropriate within its terms and conditions:

(a) A condition requiring both parties to comply with the Distribution Code.

(b) Details of the rates forming the basis of Use of System Charges.

(c) Details of capital related payments arising from necessary reinforcement or extension of the Distribution or Transmission System.

(d) Details of any ongoing charges for special services such as regular ongoing System studies or abnormal System management requirements.

(e) A condition requiring both parties to sign a Site Responsibility Schedule, detailing the divisions of responsibility at interface sites in relation to ownership, control, operation, maintenance of Plant and Apparatus and to safety of persons.

Detailed costing arrangements for the supply of standby and top-up facilities, if required, to cover any shortfall in contract quantities of electricity delivered by a Generator to a Supplier under a Connection/Use of System Agreement shall be the subject of a top-up and standby supply agreement.

6.4 Consents and Statutory Obligations

Depending on the size and type of a User’s installation which is to be connected to the DNO’s Distribution System, a User may have obligations in connection with obtaining consents and satisfying statutory obligations associated with the connection referred to in DPC1.5.

6.4.1 An offer by the DNO to a User for connection or use of the DNO’s Distribution System may be conditional upon the outcome of any or all of the following procedures relating to an extension or reinforcement of the DNO’s Distribution System or the Transmission System to permit a development by the User:

(a) An application for planning consent.

(b) Negotiations with landowners or occupiers for consent to place Plant and Apparatus on or across their land.

(c) The submission of an environmental assessment statement.

(d) A Public Inquiry.
6.4.2 A User whose development requires the DNO to engage in any of the procedures referred to in 6.4.1 or any other statutory procedure which would not otherwise be necessary shall:

(a) Provide any necessary supporting information or evidence.
(b) Ensure attendance at a Public Inquiry by such witness as the DNO may reasonably request.
(c) Bear the cost incurred in compliance with 6.4.2 (a) and (b).

6.4.3 If planning consent is granted, but is conditional upon a change in the design arrangements originally offered by the DNO (eg undergrounding), then the DNO shall make a revised offer to the User, including revised terms and timing. This revised offer shall form the basis of any Connection Agreement/Distribution Use of System Agreement.

6.4.4 If any necessary consent is not granted, the DNO shall not be obliged to fulfil any Connection Agreement/Distribution Use of System Agreement

6.5 Approval to Connect

Depending on the size and type of a User’s installation which is to be connected to the DNO’s Distribution System a DNO may specify procedures to approve the technical compliance of the User's installation and commissioning procedures to energise the connection, as provided for in DPC5.3.3. These procedures may have some or all of the typical features specified below:

6.5.1 Readiness to Connect

6.5.1.1 A User, whose development is under construction in accordance with a Connection Agreement and who wishes to establish connection with the DNO's Distribution System, shall apply to the DNO by submitting a standard connection card or otherwise in writing, stating readiness to connect and giving the following:

(a) Confirmation that the User's installation complies with the principles outlined in Regulation 25(2)(a) of the Electricity Safety, Quality and Continuity Regulations.
(b) Where appropriate update the Distribution Planning and Connection Code data based on actual values.
(c) Where appropriate update forecasts for future operational data as listed in the Distribution Data Registration Code.
(d) A proposed connection date.

6.5.1.2 The DNO may request a User to provide, in addition to his written application to the DNO for connection in accordance with 6.5.1.1, a report certifying to the DNO that all matters required by DPC4 have been considered and that DPC5 to DPC8 inclusive have been complied with by the User and incorporating:

(a) Type test reports and test certificates produced by Nationally Accredited Laboratories showing that the Plant and/or Apparatus specified in the Distribution Planning and Connection Code meet the criteria specified.
(b) Copies of the manufacturers' test certificates relating to Plant and/or Apparatus referred to in the Distribution Planning and Connection Code, including measurements of positive and zero sequence impedance of Apparatus which will contribute to the fault current at the point of connection.

c) Details of Protection arrangements and settings under DPC6.3.

d) A certificate declaring the maximum short circuit current in Ampere which the User's System would contribute to a three-phase short circuit at the point of connection, and the minimum zero sequence impedance of the User's System at the Connection Point and taking into account the contributions of any Generation Set or Power Station motors.

e) Confirmation that design conforms with the standards referred to in DPC4.

(f) A list of persons appointed by the User to undertake, and to be responsible for, the application and removal of Safety Precautions on those parts of the User's System which are directly connected to the DNO's Distribution System.

g) A list of names and telephone numbers of responsible management representatives in accordance with Distribution Operating Code DOC.9.

(h) Site Common Drawings as specified in the Connection Agreement.

(i) A single line diagram of the User's Apparatus showing all items to which the Distribution Planning and Connection Code applies.

(j) Information to enable the DNO to prepare a Site Responsibility Schedule as DPC5.4.3.

6.5.1.3 For connections at High Voltage, the User shall provide a proposed commissioning programme, giving at least six weeks notice of the proposed connection date, and detailing all proposed site testing of main and ancillary Equipment, together with the names of the organisations who are to carry out such testing.

6.5.1.4 The DNO shall be entitled to witness site testing of Equipment whose performance can reasonably be regarded as affecting the integrity of the DNO’s Distribution System. The User shall provide the DNO with certified results of all such tests and the DNO may withhold agreement to energise the User's Equipment where test results indicate that the Distribution Planning and Connection Code have not been satisfactorily complied with.

6.5.1.5 Where in advance of the proposed connection date, a Generator requires connection to the DNO Distribution System for the purpose of testing, the Generator will require satisfying the DNO of the following:

(a) Compliance with the requirements of the Connection Agreement.

(b) Provision of a commissioning programme supplied by the Generator and agreed with the DNO to allow commissioning tests to be co-ordinated in a manner detailed in Distribution Operating Code DOC-12 – “System Tests”.

September 2013
6.5.2 Confirmation of Approval to Connect

6.5.2.1 The DNO shall inform the User whether or not the DNO considers the requirements of 6.4.1 and requirements of the Distribution Planning and Connection Code are satisfied and the making of the connection is approved subject to satisfactory results of those tests which cannot be performed prior to energization of the User's Plant and Apparatus. Where approval is withheld, detailed reasons shall be stated.

6.5.2.2 When indicating agreement to the energization of a connection, the DNO shall specify the contents and sequence of the energization programme and associated testing and shall be entitled to postpone or suspend the programme where, due to circumstances which could not reasonably have been foreseen by the DNO, continuation of the programme would impose an unacceptable level of risk to the integrity of the DNO’s Distribution System.

6.5.2.3 Detailed costing arrangements for the supply of standby and top-up facilities, if required, to cover any shortfall in contract quantities of electricity delivered by a Generator to a Supplier under a Connection Agreement /Distribution Use of System Agreement shall be the subject of a top-up and standby supply agreement.

7 GOVERNANCE OF TECHNICAL STANDARDS

7.1 General

7.1.1 The Panel maintains a Standard Procedure detailing the governance arrangements. This procedure can be found on the Distribution Code Website along with the Panel Constitution and Rules: www.dcode.org.uk.

7.1.2 Industry interface standards are open to collective governance by the Panel. There are three broad classes of standards as detailed below.

7.2 Distribution Code Standards

Some standards impose Distribution Code obligations, and these are listed in Annex 1 of the Distribution Code. These standards implement Distribution Code requirements and these standards are cited in preference to stating the detail of the requirements in the Distribution Code itself. The content of these standards is subject to the governance of the Panel which will consult publicly on them, although ownership of the standards rests with the DNOs. Ofgem has to give final approval to any changes.

7.3 Other Industry Standards

There are other standards that do not impose direct Distribution Code obligations, but are nevertheless considered to be material and binding on DNOs and Users and are subject to governance by the Panel. These are listed in Appendix 2 of this Guide. These standards are governed in a similar manner to Annex 1 standards. The salient difference is that Ofgem does not need to formally approve changes to these standards. However Ofgem may approve them should the Panel fail to agree on changes to them.
7.4 Individual DNO’s standards.

These are not directly governed by the Panel, but by exception the Panel can review an individual DNO standard if the Panel’s advice is sought by Ofgem following a referral to Ofgem of an issue with an individual DNO standard by a User. Ofgem may then take the Panel’s advice into account when resolving the User’s complaint.
The Company Transmission System
132kV & Above

The Company Distribution System
33kV & Below

GB Transmission System Control Centres

Direct Customers

Other Licensees

Generators (BM Participants)

Embedded Generators (BM Participants)

Embedded Generators (Non BM Participants)

Other Licensees

Customers

The Grid Code

The Distribution Code
FIGURE 1B - GRID CODE & DISTRIBUTION CODE BOUNDARIES (ENGLAND AND WALES)
Category A Users are those having a connection at 1 kV or above (HV)

A1. Embedded Generators including CWOGs having an output capacity of 1 MW and above.

A2. Embedded Generators including CWOGs having an output capacity of less than 1 MW.

A3. Customers without generation having a Demand of 5 MW and above.

A4. Customers without generation having a Demand of less than 5 MW.

The classification threshold of 5 MW is related to the obligations that a DNO has for providing aggregated Demand information to NGC. Generators are further classified by voltage of connection and capacity for the purposes of technical standards.

Category B Users are those having a connection at below 1 kV (Low Voltage)

B1. Embedded Generators (including CWOGs) irrespective of capacity of fuse(s) or other Protection device(s).

B2. Customers who are the sole Customer with a connection to the Low Voltage side of a High Voltage to Low Voltage transformer, irrespective of the capacity of fuse(s) or other protection device(s).

B3. Customers without generation and having a single or three phase supply protected by fuse(s) or other device(s) rated at more than 100 amps.

B4. Customers without generation having a single phase or three phase supply protected by a fuse(s) or other device(s) rated at 100 amps or less.

B5. Customers with Unmetered Supplies.

B6. Customers who have connected a Generation Set in accordance with ER G83/2 and where this is their only Generation Set.

C. Suppliers including licence exempt Suppliers, unless otherwise stated.

D. Other Authorised Distributors connected to the DNO’s Distribution System, being licensed or licence exempt Distributors.

E. Meter Operators (This Distribution Code does not place any direct obligation on Meter Operators other than through the appointment by either a Supplier or a Customer.)
## Sections of the Distribution Code Applying to Particular Categories of Users of the DNO’s Distribution System

### Category of Users

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X  Not applicable.
D  Applicable with specific obligations.
R  Relevant for information but no specific obligations.
APPENDIX 2 – ELECTRICITY SUPPLY INDUSTRY STANDARDS NOT IMPLEMENTED VIA THE DISTRIBUTION CODE BUT HAVING A MATERIAL AFFECT ON USERS

Copies of the Engineering Recommendations and Technical Specifications and other documents in this Appendix are available from the Energy Networks Association, 6th Floor, Dean Bradley House, 52 Horseferry Road, London SW1P 2AF, [www.energynetworks.org](http://www.energynetworks.org).

1. **Engineering Recommendation G81** Framework for design and planning, materials specification and installation and record for Greenfield low voltage housing estate installations and associated, new, HV/LV distribution substations.

2. Energy Networks Association – Distributed Generation Connection Guide, (Parts 1, 2 and 3).


5. **Engineering Recommendation P18** Complexities of 132kV circuits.

5. **Engineering Recommendation G87** Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy Buildings
**ISSUE SUMMARY**

<table>
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<tr>
<th>No.</th>
<th>Date</th>
<th>Details of Change</th>
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<tr>
<td>1</td>
<td>01/10/02</td>
<td>This is the first issue of the Distribution Code for Great Britain. The D Code has been formed from an amalgamation of the pre-existing Scottish (Issue 4), and England &amp; Wales (Modification 13) D Codes. There are no deliberate policy changes introduced in this first issue of the GB code: the drafting reflects the requirements existing in both forerunner codes. However there are changes to the wording from both codes necessary in adopting a common text. These changes have been kept to a minimum consistent with developing a common Distribution Code for Great Britain. The detail of these changes from the forerunner codes was publicly consulted on as part of the process of introducing the Distribution Code for Great Britain. Where there are technical, regulatory or institutional differences between Scotland and England &amp; Wales the drafting has preserved these differences in the combined code where necessary.</td>
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<tr>
<td>2</td>
<td>01/03/03</td>
<td>Annex 1 amended to recognize that ER G75 has been re-issued as ER G75/1.</td>
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| 3   | 01/09/03   | Modifications in respect of data requirements for Embedded Generators – particularly:  
  - the addition of new DPC1.6 and DPC1.7;  
  - additions to DPC4.5.1;  
  - new DPC5.1.2;  
  - modified DPC7.3 and new DPC7.3.4  
  Modifications to the Distribution Data Registration Code                                                                                                                                                                                                                                                                                                                                                       |
| 4   | 01/03/04   | Introduction of ER G83/1 governing the connexion of small scale generation. Minor changes to definitions of Embedded Generator and Generator, plus new note in DPC7.1.3 and minor explanatory notes in 5.4.5 and Appendix 1 of the Guide. Rationalization of use of Embedded Generator and Generator throughout the text.  
  Modification to the following clauses for the consequential changes attendant on the replacement of the Electricity Supply Regulations with the Electricity Safety, Quality and Continuity Regulations:  
  DPC4.2.2.1; DPC4.2.2.2; DPC4.4.2; DPC4.4.4; DPC5.2.1; DPC5.3.4; DPC5.4.3; DOC5.4.8; DOC10.1.1; DOC10.4.5.1  
  Modifications to the following clauses for the consequential changes attendant on the replacement of the Electricity Supply Regulations with the Electricity Safety, Quality and Continuity Regulations:  
  DPC4.2.2.1; DPC4.2.2.2; DPC4.4.2; DPC4.4.4; DPC5.2.1; DPC5.3.4; DPC5.4.3; DOC5.4.8; DOC10.1.1; DOC10.4.5.1  
  Modifications to Glossary and Definitions: addition of Annex 1 Standard; Appendix 1 Standard; Individual DNO Standard; Qualifying Standard.  
  new DGC 4.2 (g) & (h)  
  DGC 4.4                                                                                                                                                                                                                                                                                                                                                      |
| 5   | 01/08/04   | Governance of Standards  
  Modification to:  
  Glossary and Definitions: addition of Annex 1 Standard; Appendix 1 Standard; Individual DNO Standard; Qualifying Standard.  
  new DGC 4.2 (g) & (h)  
  DGC 4.4                                                                                                                                                                                                                                                                                                                                                      |
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<td><strong>House keeping Changes to:</strong></td>
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<td>DPC 5.4.1 (and Guide 2(e)) and DPC 5.4.3</td>
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| 6 | 01/04/06 | Modifications for BETTA and LEEMPS
Significant definitional and consequential changes to harmonize with BETTA and GB Grid Code drafting.
Licence Exempt Embedded Medium Power Station drafting including:
  - New definition of a DC Converter
  - Modifications to DPC 7.3.3 in relation to data requirements
  - Addition of new section DPC 7.5 relating to data and connexion requirements
  - Addition of new Section DOC 5.6 in relation to compliance testing of Medium Power Stations |
|   |   |   |
| 7 | 01/07/06 | Replace ER P2/5 with ER P2/6 and the following consequential changes:
  - Addition of ETRs 130 and 131 to Appendix 2.
  - Harmonization of lower limit for DDRC Schedules 6 & 7 at 1MW
Replace ER G5/4 with ER G5/4-1 in Annex 1 and in DPC 4.2.3(b) |
|   |   |   |
| 8 | 01/11/06 | Modify the definitions of Large, Medium and Small Power Stations to align with changes to the GB Grid Code. |
|   |   |   |
| 9 | 01/06/08 | Minor housekeeping corrections to DGC 6.1 and DOC 1.1.5 to point to DGD 2(vi).
Replace references to G83/1 with references to G83/1-1 |
|   |   |   |
| 10 | 15/12/08 | Modified to include IDNOs in governance of the D Code. Primarily mods to DGC 4.
Gas and Electricity Consumers’s Committee changed to NCC in accordance with Ofgem directive of 1 October 2008. |
|   |   |   |
| 11 | 24/06/09 | Modified for Offshore Transmission.
New definitions of:
  - Embedded Transmission Licensee
  - Embedded Transmission System
  - Existing Offshore Generators
  - Great Britain
  - National Electricity Transmission System
  - National Electricity Transmission System Demand
  - Offshore
  - Offshore Transmission Implementation Plan
  - Offshore Transmission System Operator
  - Offshore Transmission Licensee
  - Offshore Transmission System |
Onshore Transmission Licensees  
Onshore Transmission System  
SHETL  
SPT  
and consequential amendments.

Various changes to the code to ensure that conceptually an embedded transmission system, ie an offshore transmission system connecting to a DNO network is treated like a Large Power Station for planning and operating purposes. Note that for safety interfaces etc, the offshore transmission network is treated in the code in the same way as an existing onshore transmission interface.

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<td>12</td>
<td>01/02/10</td>
<td>Addition of revised ENA TS 41-24 to Annex 1</td>
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| 13   | 01/08/10 | Revised for updated requirements for the connexion of embedded generation.  
Revision to the definition of **System Stability**  
Replacement of Annex 1 Item 3 with ER G59/2  
Removal of Annex 1 Item 4 ER G75/1  
Addition of new document to Appendix 2 - ER P18.  
New section DGC11  
DPC4.2.3 re-organized and amended to include the treatment of voltage step changes.  
New DPC4.4.1(f) citing ER P18 as a limit on 132kV system design complexity.  
New DPC 7.1.4 dealing with short term paralleling requirements  
New DPC7.2 section dealing with operational requirements transferred from G59  
New DPC7.4.3 section dealing with protection requirements, mainly transferred from G59  
Modified DPC7.4.4 for fault ride through requirements  
New DPC 7.4.5 for system stability requirements mainly transferred from ER G75/1  
New DPC 7.4.6 on earthing, largely incorporating requirements from G59  
New DPC7.4.9.2 detailing requirements for commissioning tests  
Review and updating of DDRC schedules. |
| 14   | 01/02/11 | Changes to DGC4.5 and Constitution and Rules to require consideration of greenhouse gas emissions.  
Update to Appendix 2 Item 2, the Distributed Generation Connexion |

188  
September 2013
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<td>Inclusion of Guidance Note 2 in the published version of the D Code</td>
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<td>Revision of G59/2 to G59/2-1 in Annex 1</td>
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<td>16</td>
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<td>Addition of ER G87 Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy Buildings to Appendix 2 of the Guide to the Distribution Code</td>
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<td>Minor amendments to Guidance Note 2.</td>
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<td>29/03/12</td>
<td>Minor amendments to Guidance Note 2.</td>
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<td>Replace G83/1-1 with G83/2 and update Guidance Note 2.</td>
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<td>Add Guidance Note 3</td>
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<td>Modifications to the protection requirements in 7.4.3.4 to align with G59/3</td>
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END